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ROYAL BOTANIC GARDENS, KEW

XXXII—NOTES ON AFRICAN GRASSES: XIX*

Miscellaneous Notes and New Species.

C. E. Hubbard, H. G. Schweickerdt, and J. D. Snowden.

Dignathia villosa *C. E. Hubbard*, sp. nov.; a *D. ciliata* C. E. Hubbard, inflorescentiis densioribus villoso-hirsutis, ramis brevioribus, glumis ecarinatis dorso leviter convexis pilis densis usque ad 3 mm. longis obtectis differt.

Gramen perenne, usque ad 25 cm. altum. *Culmi* erecti, graciles, rigidi, teretes, simplices vel ramosi, multinodes. *Foliorum vaginae* internodiis longiores, teretes, arcte appressae, asperulae, marginibus ciliatae, ore villoso-barbatae; ligulae ad seriem ciliorum densorum redactae, ciliis albis usque ad 3 mm. longis; laminae lineares, basi leviter contractae, apice tenuiter acutae, usque ad 7 cm. longae et 3 mm. latae, planae vel siccitate convolutae vel involutae, rigidulae, glauco-virides, demum e vaginis disarticulantes, subtus laeves, supra asperulae, glabrae vel pilis paucis longis sparsis praeditae. *Inflorescentia* spiciformis, densa, 3·5–4 cm. longa, circiter 1 cm. lata, pallida, dense villoso-hirsuta, basi in vaginis ampliatis inclusa; rhachis graciliuscula, glabra, angulata, angulis minute scaberulis; rami basi disarticulantes, dense villoso-hirsuti, parte nuda (pedunculo) circiter 1 mm. longa, spiculas 2–3 gerentes. *Spiculae fertiles* anguste ovatae, acutae, 5 mm. longae, lateraliter compressae; rhachilla nonnunquam breviter producta. *Glumae* subaequales vel superior inferiore paullo brevior, a latere visae strictae vel leviter curvatae, lineari-lanceolatae, subulatae, acutae, rigidae, ecarinatae, dorso late cartilagineo-incrassatae leviter convexae pilis patentibus albidis usque ad 3 mm. longis e tuberculis ortis densissime villoso-hirsutae, inferne marginibus angustissimis hyalinis. *Lemma* a latere visum semi-ovatum, acute acuminatum, 3·5 mm. longum, seta usque ad 1 mm. longa terminatum, carinata, carina inferne ciliolatum superne ciliatum, lateribus minute pubescens, 3-nerve, nervis lateralibus viridibus marginibus approximatis, membranaceum. *Palea* explanata lanceolata, acuta, 3–3·3 mm. longa, glabra. *Antherae* circiter 1 mm. longae. *Caryopsis* 2 mm. longa. *Spicula sterilis* 3·5–4 mm. longa, ad glumas redacta, pedicellata, pedicello 1·5–2 mm. longo dense villoso-hirsuto. *Glumae* apice leviter incurvae, ceterum spicularum fertilium glumis similes.

BRITISH SOMALILAND: without precise locality, *Godfrey Fausset.*

*Continued from K.B. 1935,311.

Saccolepis africana *C. E. Hubbard et Snowden*, sp. nov. ; affinis *S. interruptae* (Willd.) Stapf, sed spiculis minoribus oblongis vel elliptico-oblongis obtusis vel subacutis, gluma superiore et lemmate inferiore explanato obtusissimo, anthoecio supero elliptico spiculae fere aequilongo differt.

Gramen perenne, usque ad 1·5 m. altum, e rhizomate valido elongato repente ortum. *Culmi* erecti vel adscendentes, inferne plerumque validi et spongiosi, vel nonnunquam graciles, usque ad 8 mm. diametro, pauci- vel multi-nodes, simplices vel leviter ramosi, teretes, glabri, laeves. *Folia* glabra ; vaginae striatae, internodiis longiores vel superiores iis breviores, laxiusculae vel laxae, herbaceae, inferiores tenues, latae ; ligulae truncatae, 0·5–2 mm. longae, membranaceae ; laminae lineares, tenuiter acutae, 5–30 cm. vel ultra longae, 3–12 mm. latae, planae, plerumque flaccidae, virides, marginibus scabridis exceptis laeves vel superne nervis scabridae, costa media gracili. *Panicula* spiciformis, demum longe exserta, cylindrica, plerumque 6–30 cm. vel ultra longa, 5–8 mm. lata, densa ; rhachis validiuscula ; pedicelli 0·5–2 mm. longi. *Spiculae* oblongae vel elliptico-oblongae, subacutae vel obtusae, demum turgidulae, 2·5–3·2 (raro 3·5) mm. longae, 1–1·3 mm. latae, glabrae, plerumque virides, nonnunquam superne brunneolae vel purpurascentes. *Gluma inferior* subrotunda, obtusissima, tertiam vel fere dimidiam partem spiculae aequans, subhyalina, 5–8-nervis ; gluma superior spiculae aequilonga, elliptico-oblonga, obtusissima, membranacea, prominenter 9-nervis. *Anthoecium inferum* sterile : lemma glumae superiori subsimile, 7–10-nerve ; palea hyalina, plus minusve redacta. *Anthoecium superum* ♀, ellipticum, acutum, 2·5–2·8 mm. longum, 1–1·2 mm. latum : lemma et palea demum crustacea ; antherae 1·5–2 mm. longae ; caryopsis late elliptica, circiter 1·5 mm. longa.

French Guinea : Timbo, growing in water, *Pobéguin* 1740 ; neighbourhood of Kindia, *Jacques* 125.

French Sudan : Gao, in the Niger, *Chevalier* 43048, 43120 ; Tenenkou, inundated grasslands, *Lean* 103.

Sierra Leone : Bumba, 210 m., *Thomas* 1944, 1991 ; Kabala, 400 m., *Thomas* 2110 ; Mamaha, *Thomas* 4508 ; Yombana, *Thomas* 4691 ; near Njala, in 1 m. of water, *Deighton* 1993 ; Mapaki, in swamp-rice field, *Deighton* 1315.

Liberia : Gbanga, in wet swale, *Linder* 521.

Northern Nigeria : Sokoto, in stream-beds and marshes, *Dalziel* 478 (type) ; Sokoto, *Moisier* 136a ; Naraguta, *Lely* 327; Argungu, in the Sokoto (Rima) River, grain eaten in times of scarcity, *Lamb* 101 ; Baga Seyoram, near Lake Chad, in 0·3 m. of water, *Gwynn* 109.

Southern Nigeria : Opobo, *Jeffrys* 16 ; Lagos, *Rowland*.

St. Thomas Island : Macambrara, 1100 m., *Moller* 134.

Belgian Congo : Lower Congo, *Smith* ; Kitobola, *Vanderyst* 492 ; Kwango District, Bandundu, *Vanderyst* 4270.

Angola : Cunene marshes, in fairly deep water, *Pearson* 2005, 2036.

Anglo-Egyptian Sudan : Jur ; Ghattas' Seriba, *Schweinfurth* 2315 ; Lado, Yei River, side of Kagulu Khor, *Sillitoe* 5 ; Upper Nile Province, Tonga, *Brown* 1467 ; near Taufikiya, on right bank of R. Nile, *Simpson* 7452.

Abyssinia : Lake Tsana, south shore near Bahrdar Giyorgis, *Grabham*.

Uganda : Entebbe, an aquatic, *Fyffe* 41 ; Mengo District, Namanyonyi, in grassy swamp, 1200 m., *Dummer* 2814 ; Budama District, in swamps, 1140 m., *Snowden* 1257.

Nyasaland : Karonga, *Whyte*.

Northern Rhodesia : Mumbwa District, Lubali River, in swampy pans of the river-bed, 1080 m., *Adamson* in *Herb. Trapnell* 2572.

Natal : Durban, *Wood* 3589 ; near Durban, in stagnant water, *Drège*.

This African species was included under *Saccolepis interrupta* (Willd.) Stapf (*Panicum interruptum* Willd.) by Stapf in Prain, Fl. Trop. Afr. **9**, 757 (1920). The latter is, however, a distinct species, readily recognised by its larger usually acute spikelets and relatively shorter fertile florets. It is widely spread in the Indo-Malayan Region and extends into East Tropical Africa (Tanganyika Territory : Manyoni District : Kazikazi, in seasonal rain-ponds, 1260 m., *Burtt* 2628).

The following three gatherings from West Tropical Africa have spikelets 3·5–4 mm. long and comparatively short false-spikes, but the shape and structure of the spikelets agree with those of *S. africana* :—Sierra Leone : Northern Province, Materboi, in swampy grassfields, *Glanville* 87 ; Bonthe Island, Tisana, edge of freshwater marsh, *Deighton* 2306. Northern Nigeria : Fodama, *Moisier* 224. They probably represent a distinct strain evolved from the above new species.

Hyparrhenia dissoluta (*Nees*) *C. E. Hubbard* ex Hutch. in Hutch. & Dalz. Fl. W. Trop. Afr. **2**, 591 (1936). *H. Ruprechtii* Fourn. Mex. Pl. **2**, 67 (1886). *Anthistiria dissoluta* Nees ex Steud. Syn. Pl. Glum. **1**, 400 (1854).

The type-specimen of *Anthistiria dissoluta* is in the Cambridge Herbarium. It was collected in Sierra Leone by Dr. Barry.

Homozeugos Eylesii *C. E. Hubbard*, sp. nov. ; affine *H. huillensi* Stapf, sed foliis linearibus planis, nodis glabris, ligulis elongatis, spiculis longe pilosis differt.

Gramen perenne, 1–1·5 m. altum. *Culmi* erecti, teretes, rigidi, validiusculi, simplices, 3–4-nodes, laeves, prope inflorescentiam sparse pilosi vel omnino glabri. *Foliorum vaginae* auriculatae, arcte appressae, laeves, glabrae vel appresse pubescentes, inferiores imbricatae, superiores internodiis breviores ; ligulae anguste lanceolatae, auriculis adnatae, usque ad 3 cm. longae ; laminae lineares, in acumen tenue longe attenuatae, usque ad 40 cm. (vel ultra) longae et 6 mm. latae, planae, firmae, glabrae vel appresse pubescentes, laeves vel scaberulae. *Racemi* 1–4, graciles, pallidi, villosi, 10–20 cm. longi, sessiles vel breviter pedunculati, tarde disarticulantes ; rhacheos internodia gracillima, usque ad 10 mm. longa, dense ciliata, pilis albis usque ad 6 mm. longis ; pedicelli internodiis similes, usque ad 7 mm. longi. *Spiculae* lineari-oblongae vel lineari-lanceolatae, 7–9 mm. longae (callo excluso) ; callus 1–2 mm. longus, subacutus, breviter barbatus. *Glumae* aequales ; inferior explanata lanceolato-oblonga vel oblonga, truncata, coriacea, marginibus involutis, 7–9-nervis, molliter pilosa, pilis patulis albis usque 5 mm. longis ; superior explanata anguste lanceolato-oblonga vel anguste oblonga, truncata, coriacea, 3-nervis, marginibus superne ciliolatis, dorso pubescens vel sparse pilosa. *Anthoecium inferum* sterile : lemma oblongum, truncatum, 6–7 mm. longum, tenuiter membranaceum, hyalinum, 2-nerve, marginibus pubescentibus ; palea nulla. *Anthoecium superum* ♀ : lemma oblongo-lineare, integrum, circiter 6 mm. longum, 3-nerve, superne ciliolatum ; palea 1 mm. longa, hyalina ; arista geniculata, gracillima, 2–3 cm. longa, columna pubescente 14–16 mm. longa ; antherae 4 mm longae ; caryopsis oblanceolato-oblonga, 4 mm. longa.

Northern Rhodesia : Mufulira, in open forest, May 1934, *Eyles* 8369 (type), 8371.

Diheteropogon maximus *C. E. Hubbard*, sp. nov. ; affinis *D. grandifloro* (Hack.) Stapf et *D. Buchneri* (Hack.) Stapf, culmis validioribus altioribus superne ramosis, foliorum laminis latioribus, racemis longioribus, spiculis pedicellatis majoribus differt.

Gramen perenne, compacte caespitosum, usque ad 2 m. altum. *Culmi* erecti, validi, teretes, circiter 7 mm. diametro, 6-nodes, superne ramosi, apice ramulorum inflorescentias gerentes, glabri, laeves, prope nodos pruinosi. *Foliorum vaginae* demum internodiis breviores, glabrae, laeves, striatae ; ligulae truncatae, usque ad 2 mm. longae, scariosae, glabrae ; laminae lineares, tenuiter acutae, usque ad 55 cm. longae, 10–16 mm. latae, planae, firmae, virides, pone ligulam pilis longis exceptis glabrae, marginibus scaberulae, ceterum laeves. *Racemi* validi, usque ad 18 cm. longi et 15 mm. lati, erecti, approximati, unus sessilis, alter breviter pedunculatus ; spicularum paria homogama 3–6 ; rhacheos internodia inter paria heterogama linearia, circiter 8 mm. longa, marginibus dense molliter ciliata, superne dorso convexa, apice excavata bidentata vel emarginata, inter paria homogama subsimilia sed glabra nec apice

excavata ; pedicelli internodiis adjacentibus similis sed magis applanati. *Spiculae sessiles fertiles* lineari-oblongae, 8–10 mm. longae (callo excluso), apicem versus attenuatae, stramineae ; callus pungens, 4 mm. longus, pilis albis sericeis dense barbatus. *Gluma inferior* glabra, laevis, 2-nervis, inter carinas crassas obtusas late sulcata, marginibus tenuibus et apice hyalino exceptis coriacea ; superior dorso convexa, prope apicem carinata, 1-nervis. *Anthoecium inferum* : lemma obovato-oblongum, rotundato-obtusum, 7 mm. longum, tenuissime 2-nerve, hyalinum, marginibus pilis debilibus ciliatum. *Anthoecium superum* ♀ : lemma lineari-oblongum, 6 mm. longum, breviter bilobum, lobis obtusis ciliolatis, marginibus hyalinis ; arista usque ad 13 cm. longa, fulva, columna laxe torta dense et breviter pilosa, seta scabrida ; palea elliptica, obtusa, 3·5 mm. longa, hyalina, 2-nervis, ciliolata ; antherae 5–6 mm. longae. *Spiculae sessiles masculae vel steriles* 12–15 mm. longae ; antherae usque ad 10 mm. longae. *Spiculae pedicellatae* ♂, anguste elliptico-oblongae, acutae, 2·3–2·7 cm. longae, 7 mm. latae, virides vel purpureo-suffusae. *Gluma inferior* nervis valde approximatis praedita, intus puberula, extra glabra, laevis, alis scariosis exceptis chartacea, ala latiore superne usque ad 2 mm. lata ; gluma superior explanata anguste oblonga, acuta, tenuiter 3-nervis, marginibus ciliata. *Anthoecium inferum* : lemma anguste oblongum, obtusum, usque ad 20 mm. longum, 3-nerve, marginibus pilis debilibus ciliatum. *Anthoecium superum* ♂ : lemma anguste oblongum, obtusum vel breviter bilobum et mucronulatum, usque ad 14 mm. longum, 1-nerve, marginibus laxe ciliolatum ; palea lineari-oblonga, 6 mm. longa, glabra ; antherae 12–14 mm. longae.

ANGOLA : Malange Plateau ; Kirima, near the Rivers Jombo and Luando, 1000 m., Feb. 1931, *Gossweiler* 9497.

Brachiaria humidicola (*Rendle*) *Schweickerdt, comb. nov. Panicum humidicolum* Rendle in Cat. Welw. Afr. Pl. **2,** 169 (1899) et in Journ. Linn. Soc., Bot. **40,** 229 (1911). *Brachiaria dictyoneura* Stapf in Prain, Fl. Trop. Afr. **9,** 512 (1919), pro parte ; Stent & Rattray in Proc. Rhod. Sc. Assoc. **32,** 22 (1933) ; Arnold in Rhod. Agric. Journ. **33,** 4. 236 (1936) ; Hutchinson & Dalziel, Fl. West Trop. Afr. **2,** 2. 563 (1936).

Panicum humidicolum Rendle was considered by *Stapf* to be conspecific with *Panicum dictyoneurum* Fig. et De Not. and on transference of the latter species to the genus *Brachiaria* Gris., Rendle's species was placed by him under *Brachiaria dictyoneura* (Fig. et de Not.) Stapf in Prain, Fl. Trop. Afr. Additional material accumulated in the Kew Herbarium since the publication of that volume has shown on critical examination that part of this resembled *Panicum humidicolum* Rendle, i.e. *B. humidicola* (Rendle) Schweickerdt, a species deserving independent specific rank.

As these two species are very closely allied, their main distinguishing characters may be tabulated as follows :—

	B. dictyoneura	*B. humidicola*
1.	A densely caespitose perennial ; stolons always absent ; culms often geniculately ascending but never taking root at the nodes.	A creeping perennial giving rise to a number of stolons from which the culms arise at intervals ; culms usually geniculately ascending, often rooting at the nodes.
2.	Panicle usually consisting of 4 to many racemes.	Panicle usually consisting of 3-4 racemes, rarely more.
3.	Spikelets up to 7 mm. long, but usually somewhat smaller, narrowly-elliptic to elliptic in outline.	Spikelets up to 5 mm. long, but usually somewhat smaller, elliptic to broadly-elliptic in outline.
4.	Upper glume usually 7-9-nerved.	Upper glume usually 5-7-nerved.
5.	Lemma of the upper floret 3–3·5 mm. long and ± 1·5 mm. wide, with a well developed apiculus, usually slightly yellowish in colour when mature.	Lemma of the upper floret 3·5-4 mm. long and 2 mm. wide, with an inconspicuous apiculus, usually pure white in the mature condition.
	The relatively more slender and shorter upper lemma in comparison to the length of the glumes and lower lemma accounts for the more elongated and tapering appearance of the whole spikelet.	The large lemma in comparison to the size of the glumes and lower lemma gives the spikelets a more rounded, turgid and blunt appearance.

Owing to the close resemblance of the above species, they have been somewhat confused as may be seen from the synonymy cited above.

Their geographic distribution is somewhat different ; whereas *B. dictyoneura* appears to be limited to North Central—and North Eastern Tropical Africa, *B. humidicola* ranges from Northern Nigeria through Angola to Tanganyika Territory, the Rhodesias, Portuguese East Africa and finally reaches the subtropical parts of the Eastern Transvaal. It is only in Tanganyika Territory that these species overlap.

The following is a rearrangement of the material in the Herbaria at Kew and the British Museum in accordance with the above conception of these species.

1. **Brachiaria dictyoneura** (*Fig. et De Not.*) *Stapf.*
SOUTHERN ABYSSINIA : without precise locality, *Stordy*.
KENYA COLONY : Nairobi, Sept., *Hitchcock* 24516. May, *Linton*.

3. Jan., *Napier* 857. Sept., *Dowson* 230. Kitui, *Hildebrandt* 2663.

TANGANYIKA TERRITORY: Kondoa Irangi Distr.; near Kolo, Jan., *Burtt* 1276. near Sambola, May, *Burtt* 2620. *Phillips* in Nat. Herb. Pret. 15709, 15710. at Hundwe, Jan., *Burtt* 1534. *Burtt & Phillips* 1093. near Mangoloma Febr., *Burtt* 1567. Massai-Steppe, *Merker* s.n. Usambara, Bonda, *Holst* 4015. Without precise locality, *Hannington*, s.n.

Through the courtesy of Prof. Dr. R. Pilger, Berlin, who kindly sent me fragments of the type of *Panicum albovellereum* K. Schum., it was possible to identify this species as *Brachiaria dictyoneura* (Fig. et De Not.) Stapf.

2. Brachiaria humidicola (*Rendle*) *Schweickerdt.*

NORTHERN NIGERIA: Naraguta, Bauchi Plateau, July, *Lely* P. 405.

ANGOLA: Huilla, *Welwitsch* 2678.

TANGANYIKA TERRITORY: Bukoba, July, *Haarer* 205. Iringa, Febr. *Lynes*, I.g.146.

NORTHERN RHODESIA: Kafue Flats, Mazabuka, Jan.-Febr., *Trapnell* 841, 862, 868.

SOUTHERN RHODESIA: Salisbury, Jan., *Eyles* 588, 2932. *Trapnell* 751. *Mundy* 42, and in *South. Rhod. Govt. Herb.* 2825.

PORT. EAST AFRICA: open woods at Beira, *Swynnerton* 1596b.

TRANSVAAL: Nelspruit, June, *Liebenberg* 3501. Cultivated at Prinshof Expt. Station, Pretoria, *Nat. Herb.* 8022.

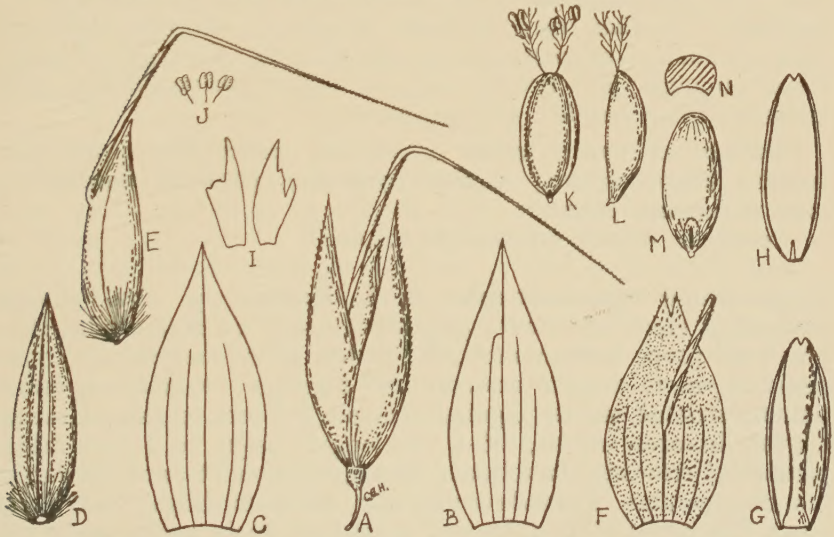

Fig. 1. *Hypseochloa cameroonensis* C. E. Hubbard. A, spikelet, × 12; B, lower glume, flattened, × 12; C, upper glume, flattened, × 12; D, floret, from the front, × 12; E, floret, with awn, × 12; F, lemma, flattened, × 12; G, palea, × 12; H, palea from back, to show prolongation of rhachilla, × 12; I, lodicules, × 14; J, stamens, × 10; K,L,M, caryopsis, × 14; N, transverse section of caryopsis.

A New Genus from the Cameroons Mountain.

C. E. Hubbard.

Hypseochloa *C. E. Hubbard*; genus novum cum *Agroste* L. et *Aira* L. comparandum; ab illa glumis 5- (raro superiore 3-) nervibus, lemmate acute et breviter bifido demum indurato et crustaceo marginibus rigide involutis, palea prominenter bicarinata carinis angustissime alatis; ab hac spiculis unifloris, glumis 5-(raro superiore 3-) nervibus differt.

Spiculae anguste ellipticae vel anguste oblongae, demum hiantes, lateraliter compressae, aristatae, in paniculam laxam pedicellatae; rhachilla supra glumas et infra anthoecium disarticulans, ut acumen minutum glabrum supra anthoecium producta. *Anthoecium* 1, ♀, glumis paullo brevius. *Glumae* persistentes, aequales, similes, a latere visae lanceolatae, acuminatae, tenuiter acutae, nonnunquam mucronatae, basin versus dorso rotundatae, superne carinatae, firme membranaceae, marginibus hyalinis, demum tenuiter chartaceae, glabrae, quinquenerves (vel superior trinervis). *Lemma* a latere visum oblongum, oblique acuminatum, acutum, dorso rotundatum, marginibus involutis approximatis parallelis, demum rigidum et induratum, crustaceum, tenuiter quinquenerve, glabrum, apice breviter et acute bifidum, dorso supra medium aristatum; callus minutus, rotundato-obtusus, breviter barbatus; arista geniculata, scaberula, columna torta. *Palea* oblonga, minute bifida, lemmate paullo brevior, hyalino-membranacea, bicarinata, carinis angustissime alatis, inter carinas leviter concava. *Lodiculae* duae, lanceolatae, hyalinae. *Stamina* tria; antherae ellipticae. *Ovarium* glabrum; styli terminales; stigmata pilis sparsis plumosa. *Caryopsis* oblonga, dorso rotundata, facie leviter concava, inter lemma paleamque arcte inclusa; hilum basale; embryo parva.

Gramen annuum; culmi gracillimi, paucinodes; foliorum laminae angustissimae; ligulae hyalinae; panicula terminalis; rami trichotomo-divisi.

Species 1, Africae occidentalis incola.

Hypseochloa cameroonensis *C. E. Hubbard* sp. nov. *Culmi* fasciculati, erecti vel leviter geniculati, usque ad 30 cm. alti, simplices vel prope basin ramosi, 2–3-nodes, glabri laevesque; internodia superiora demum exserta. *Folia* glabra; vaginae angustae, tenuiter striatae, laeves; ligulae oblongae, 2–5 mm. longae; laminae anguste lineares, acutae, 2·5–9 cm. longae, usque ad 1 mm. latae, planae vel siccitate convolutae, tenues, tenuiter et arcte nervatae, minute asperulae. *Panicula* ovata, laxa, 3·8–9 cm. longa, 1·2–3·8 cm. lata; rhachis gracillima, laevis; rami bini, basin versus nudati et simplices, supra trichotomo-divisi, flexuosi, glabri, laeves; pedicelli capillares, laeves, inaequales, 2–5 mm. longi, apice leviter incrassati. *Spiculae* 3 mm. longae, pallide virides vel purpurascentes. *Glumae* carinis superne scaberulae. *Lemma* 2–2·5 mm. longum, minute asperulum; callus pilis albis usque ad 1 mm. longis barbatus;

arista 4–6 mm. longa, medio geniculata, seta divaricata. *Palea* usque ad 2 mm. longa. *Lodiculae* fere 1 mm. longae. *Antherae* 0·2–0·3 mm. longae. *Caryopsis* 1·3 mm. longa.

SOUTHERN NIGERIA: Cameroons Mtn., in grassland, 2250 m., *Maitland* 874; above Buea, frequent between tufts of high grasses in grassland, 2790 m., *Mildbraed* 10881 (type); amongst rocks and boulders, 3600 m., *Maitland* 1274A.

The spikelets are cleistogamous, the minute anthers being enclosed in the mature florets and entangled in the hairs of the stigmas.

Hypseochloa occupies a somewhat intermediate position between *Agrostis* L. (*Agrosteae*) and *Aira* L. (*Aveneae*). The former genus may be distinguished by its 1–3-nerved glumes, and thin often hyaline more or less truncate lemma which does not become indurated at maturity. The solitary florets are remarkably similar to those of *Aira caryophylla* L. and were it not for the different glumes it might be considered a reduced *Aira*.

New Species of Agrostis from Tropical Africa.

C. E. Hubbard.

Agrostis congesta *C. E. Hubbard*, sp. nov.; ab *A. Schimperiana* Hochst., spiculis majoribus, lemmate prope basin aristato, arista usque ad 5 mm. longa distinguenda.

Gramen perenne, usque ad 90 cm. altum. *Culmi* erecti vel geniculato-adscendentes, graciles, simplices, 2–3-nodes, glabri, tenuiter scaberuli, internodio summo demum longe exserto. *Foliorum vaginae* striatae, glabrae, tenuiter scaberulae, internodiis tandem breviores; ligulae oblongae, demum laceratae, usque ad 4 mm. longae, dorso asperulae; laminae anguste lineares, usque ad 30 cm. longae et 3 mm. latae, planae vel convolutae, virides, glabrae, nervosae, scaberulae. *Panicula* contracta, densa, spiciformis, erecta, usque ad 16 cm. longa et 1·2 cm. lata; rhachis scaberula; rami plerumque bini, erecti, filiformes, scaberuli, inferiores usque ad 7·5 cm. longi, prope basin per 0·4–3 cm. nudati, supra dense spiculati; pedicelli laterales brevissimi. *Spiculae* anguste oblongae, 4–4·5 mm. longae, virides vel purpureo-tinctae; rhachilla minute producta, glabra. *Glumae* subaequales vel superior paullo brevior, acutae, membranaceae, carinis superne scaberulae; inferior ambitu anguste lanceolata, 3-nervis, nervis lateralibus brevibus; superior lanceolato-linearis, 1-nervis. *Lemma* explanatum ovato-oblongum, truncatum, circiter 3 mm. longum, hyalino-membranaceum, glabrum, asperulum, 5-nerve, nervis lateralibus breviter excurrentibus; arista prope basin lemmatis orta, leviter geniculata, usque ad 5 mm. longa, columna usque ad 3 mm. longa; callus sparse et breviter barbatus. *Palea* oblongo-lanceolata, 2 mm. longa, tenuiter 2-nervis. *Caryopsis* 2 mm. longa.

SOUTHERN NIGERIA: Cameroons Mtn., 2400–3000 m., *Mann* 2086 (type); 2280 m., in grassland, *Maitland* 1034.

Agrostis Whytei *C. E. Hubbard*, sp. nov.; affinis *A. keniensi* Pilger, sed panicula contracta angusta, spiculis densiusculis, rhachilla glabra, lemmate et palea breviore differt.

Gramen perenne (?), parte basali ignota. *Culmi* paniculam versus minute asperuli. *Folia* superiora glabra, viridia ; vaginae elongatae, striatae, laeves ; ligulae oblongae, usque ad 5 mm. longae, scariosae ; laminae lineares, tenuiter acutae, usque ad 20 cm. longae, 3–4 mm. latae, planae, firmae, arcte nervosae, nervis scaberulis. *Panicula* elongata, angusta, 20–35 cm. longa, 1·8–3·8 cm. lata, contracta, interrupta, densiuscula, leviter flexuosa ; rhachis graciliuscula, inferne laevis, superne scaberula ; rami fasciculati, inaequales, filiformes, scaberuli, longiores basin versus per 6 cm. nudati et simplices, superne crebre divisi, breviores prope basin ramosi, inferiores usque ad 13·8 cm. longi ; pedicelli laterales spiculis breviores. *Spiculae* 4 mm. longae, late hiantes, purpureae vel virides ; rhachilla glabra, minutissime producta. *Glumae* a latere visae lineari-lanceolatae, acutae, firme membranaceae, carinis scaberulae, lateribus leviter scaberulae ; inferior 1-nervis ; superior inferiore paullo brevior, 1–sub3-nervis. *Lemma* explanatum ovato-oblongum, truncatum, 2·5–2·7 mm. longum, membranaceum, 5-nerve, nervis lateralibus breviter excurrentibus, nervis laxe et breviter pilosum ; callus breviter barbatus ; arista e medio lemmatis orta, geniculata, usque ad 4 mm. longa, columna 1·5 mm. longa. *Palea* 0·7–1·5 mm. longa, oblonga, tenuissime 2-nervis. *Antherae* 1 mm. longae.

NYASALAND : Mt. Zomba, 1300–2000 m., *Whyte*.

This species is also related to *Agrostis continuata* Stapf, but may be distinguished by the longer looser panicle, longer-bearded callus, and the insertion of the awn at the middle of the valve.

Agrostis Pilgeriana *C. E. Hubbard*, sp. nov.; ab *A. Schimperiana* Hochst., panicula laxa latiore, lemmate pubescente e medio aristato, arista 3·5–4 mm. longa distinguenda.

Gramen perenne, usque ad 70 cm. altum. *Culmi* basi prostrata geniculato-adscendentes, gracillimi, simplices vel e nodis inferioribus ramosi, 7-nodes, prope paniculam leviter scaberuli, ceterum glabri laevesque ; internodia superiora exserta. *Folia* glabra ; vaginae tenuiter striatae, asperulae vel laeves ; ligulae oblongae, truncatae, 4 mm. longae, scariosae ; laminae lineares, tenuiter acutae, usque ad 10 cm. (vel ultra) longae, 1–3 mm. latae, planae, tenuiter scaberulae vel laeves. *Panicula* laxa, ovato-oblonga, usque ad 10 cm. longa et 3 cm. lata, flexuosa ; rhachis filiformis, superne scaberula ; rami 2–3-nati, tenuiter filiformes, flexuosi, prope basin per 0·6–1·8 cm. nudati, superne densiuscule spiculati, scaberuli, inferiores usque ad 3·7 cm. longi ; pedicelli laterales 0·6–2 mm. longi, terminales longiores. *Spiculae* anguste ellipticae, demum hiantes, 3 mm. longae, purpureae ; rhachilla minutissime producta. *Glumae* subaequales, a latere visae anguste lanceolatae et tenuiter acutae, membranaceae, 3-nerves, nervis lateralibus brevibus, carinis

scabrido-ciliolatae, lateribus sparse scabridae. *Lemma* explanatum late elliptico-oblongum, truncatum, denticulatum, fere 2 mm. longum, tenuiter membranaceum, 5-nerve, nervis lateralibus breviter excurrentibus, parte tertia superiore excepta tenuiter pubescens ; arista prope medium lemmatis orta, recta, 3·5–4 mm. longa, columna 1 mm. longa ; callus brevissime barbatus. *Palea* anguste oblonga, lemmati fere aequilonga, nervis minute excurrentibus. *Antherae* 0·6 mm. longae.

Kenya Colony : Mount Kenya, upper Bamboo region, 2800 m., *Fries* 1342.

Agrostis isopholis *C. E. Hubbard*, sp. nov.; ab *A. Pilgeriana* C. E. Hubbard, culmis 3–4-nodibus suberectis, laminis angustioribus, panicula anguste oblonga, spiculis minoribus, palea lemmati subaequilonga, arista breviore distinguenda.

Gramen perenne, usque ad 45 cm. altum. *Culmi* e basi geniculata erecti, graciles, simplices, vel e nodis inferioribus ramosi, 3–4-nodes, glabri laevesque ; internodia summa tandem longe exserta. *Folia* glabra ; vaginae internodiis inferioribus longiores, laeves ; ligulae oblongae, rotundato-obtusae, 2–3 mm. longae, scariosae ; laminae anguste lineares, in acumen tenue attenuatae, usque ad 10 cm. longae, 1–1·5 mm. latae, planae vel involutae, rigidiusculae, laeves vel supra et marginibus tenuiter scaberulae. *Panicula* anguste oblonga, 7·5–16 cm. longa, usque ad 2·5 cm. lata, erecta, laxa ; rhachis gracillima, laevis ; rami fasciculati, tenuiter filiformes vel capillares, flexuosi, prope basin per 1–3 cm. nudati, superne laxe divisi, laeves, inferiores usque ad 6 cm. longi ; pedicelli laterales 2–4 mm. longi, terminales longiores. *Spiculae* anguste ellipticae vel oblongae, demum hiantes, 2·6–3 mm. longae, purpureae ; rhachilla usque ad 0·5 mm. producta, pubescens. *Glumae* aequales vel subaequales, lanceolatae, acutae, membranaceae, carinis superne sparse scabrido-ciliolatae, 3-nerves, nervis lateralibus brevibus. *Lemma* explanatum late ovato-oblongum, anguste truncatum, glumis aequilongum vel paullo brevius, tenuiter membranaceum, 5-nerve, nervis lateralibus breviter excurrentibus, parte tertia superiore excepta pilis patulis brevibus laxe pilosum, asperulum ; arista prope medium lemmatis orta, tenuissima, recta, 1–2·5 mm. longa ; callus breviter barbatus. *Palea* oblonga, obtusa, 1·5 mm. longa, hyalina, tenuissime 2-nervis. *Antherae* 1 mm. longae.

Belgian Congo : Virunga Mtns.; Mt. Karisimbi, from great swamp on north plateau, 3000 m., *Burtt* 3090.

Agrostis sororia *C. E. Hubbard*, sp. nov.; affinis *A. Mannii* Stapf, sed glumis inaequalibus, gluma inferiore acuminata, lemmate late ovato, culmis laevibus differt.

Gramen perenne, usque ad 75 cm. altum. *Culmi* erecti vel geniculato-adscendentes, nonnunquam basi prostrati et e nodis radicantes, modice graciles, simplices, 3–7-nodes, glabri, laeves. *Folia* glabra ; vaginae striatae, internodiis breviores vel longiores,

laeves vel retrorse scaberulae ; ligulae oblongae, usque ad 7 mm. longae, scariosae ; laminae lineares, in acumen tenue attenuatae, usque ad 20 cm. longae, 2·5–5 mm. latae, planae, firmae, nervosae, scaberulae, vel subtus laeves. *Panicula* laxa, flexuosa, usque ad 23 cm. longa et 6 cm. lata ; rhachis laevis, vel superne scaberula ; rami filiformes, sparse vel dense scaberuli, basi per 1·5–7·5 cm. nudati, superne laxe divisi, inferiores fasciculati, usque ad 12·5 cm. longi ; pedicelli laterales 1–3 mm. longi. *Spiculae* late hiantes, 3·5–4·5 mm. longae, virides vel purpurascentes ; rhachilla in acumen pilosum usque ad 1 mm. producta, nonnunquam setam tenuissimam usque ad 3 mm. longam gerens. *Glumae* membranaceae, 1–3-nerves, nervis lateralibus brevibus ; inferior a latere visa anguste lanceolata, tenuiter acuta, carina superne scaberula, apice saepe leviter recurvata ; superior minus acuta, circiter tres partes inferioris aequans, carina laevis vel prope apicem leviter scaberula. *Lemma* explanatum late oblongum, anguste truncatum vel leviter bifidum, 2–2·5 mm. longum, laxe et breviter pilosum, 5-nerve, nervis lateralibus excurrentibus extimis in mucrones usque ad 1 mm. longos productis ; arista prope basin lemmatis orta, geniculata, usque ad 7·5 mm. longa, columna usque ad 2·5 mm. longa ; callus barbatus. Palea lanceolata, lemmati subaequilonga, nervis breviter excurrentibus. *Antherae* 1·2–1·5 mm. longae.

Uganda : Mt. Elgon, Bamboo zone, *Liebenberg* 1691 ; Mt. Ruwenzori, 3000 m., *Oliver* 16 (type).

Closely related to *A. Mannii* (Hook. f.) Stapf, which has subequal and similar glumes, the lower glume not recurved at the tip, and elliptic-oblong truncate lemmas.

Agrostis tricholemma *C. E. Hubbard*, sp. nov.; *A. Mannii* Stapf affinis, culmis laevibus, glumis oblongo-lanceolatis 1-nervibus, rhachilla haud producta, arista breviore, nervis lemmatis non excurrentibus differt.

Gramen perenne, caespitosum, usque ad 90 cm. altum. *Culmi* erecti vel basi geniculati, graciles, simplices, 3–4-nodes, glabri, laeves. *Foliorum vaginae* internodiis tandem breviores, tenuiter striatae, glabrae, laeves ; ligulae oblongae, usque ad 2 mm. longae, membranaceae, demum laceratae ; laminae anguste lineares, in acumen tenue attenuatae, usque ad 15 cm. longae et 3 mm. latae, planae, firmae, glabrae, laeves vel minute scaberulae. *Panicula* angusta, contracta, 12·5–25 cm. longa, 1·2–2·5 cm. lata, flexuosa, nutans ; rhachis inferne laevis, superne leviter scaberula ; rami 2–4-nati, distantes, inaequales, filiformes, flexuosi, erecti vel adscendentes, scaberuli, longiores basi per 2–3·5 cm. nudati, inferiores usque ad 10 cm. longi ; pedicelli 1–5 mm. longi. *Spiculae* oblongae, demum leviter hiantes, 3·5–4 mm. longae, pallide virides vel purpureo-tinctae ; rhachilla haud producta. *Glumae* anguste oblongo-lanceolatae, acutae, firme membranaceae, subaequales, 1-nerves, carinis scaberulae, lateribus sparse asperulae. *Lemma* explanatum oblongo-ovatum, truncatum, 2·5–2·8 mm. longum,

tenuiter membranaceum, apice minute ciliolatum, prope apicem exceptum appresse pilosum, 5-nerve, nervis lateralibus minute excurrentibus ; arista triente inferiore lemmatis orta, leviter geniculata, 3 mm. longa ; callus breviter barbatus. *Palea* lanceolato-oblonga, obtusa, usque ad 2·5 mm. longa, inter nervos sparse pubescens. *Antherae* 1·5 mm. longae, apicibus apiculatis.

Tanganyika Territory : Iringa Province ; Msima Stock Farm, in vleis, *Emson* 359.

Agrostis Burttii *C. E. Hubbard*, sp. nov.; affinis *A. kilimandscharicae* Mez, sed panicula densiore, culmis validiusculis 4–5-nodibus, lemmate pilis longis villoso differt.

Gramen perenne, usque ad 60 cm. altum. *Culmi* erecti vel suberecti, validiusculi, 4–5-nodes, internodiis inferioribus brevibus, e nodis inferioribus ramosi, glabri, laeves. *Folia* glabra ; vaginae internodiis longiores, latae, laxiusculae, striatae, laeves ; ligulae oblongae, truncatae, usque ad 5 mm. longae, scariosae ; laminae lineares, in acumen tenue attenuatae, usque ad 18 cm. longae, 3–5 mm. latae, planae, erectae, rigidiusculae, virides, nervosae, supra nervis scaberulae, subtus laeves. *Panicula* contracta, densiuscula, usque ad 23 cm. longa et 6 cm. lata, flexuosa ; rhachis laevis vel fere laevis ; rami 2–3-nati, flexuosi, filiformes, scaberuli, basi nudati, superne divisi et dense spiculati, inferiores usque ad 12·5 cm. longi ; pedicelli laterales usque ad 2 mm. longi, terminales longiores. *Spiculae* late hiantes, 3 mm. longae, pallide virides vel pallide purpureae ; rhachilla basi pilosa, in setam tenuissimam usque ad 3 mm. producta. *Glumae* subaequales vel superior inferiore paullo brevior, a latere visae anguste lanceolatae, acutae, membranaceae, 1-nerves, carinis scaberulae vel gluma superior fere laevis. *Lemma* explanatum ovatum, truncatum, 2–2·5 mm. longum, tenuiter membranaceum, pilis longis tenuissimis villosum, 5-nerve, nervis lateralibus excurrentibus extimis in mucrones usque ad 1 mm. longos productis ; arista prope basin lemmatis orta, usque ad 7 mm. longa, leviter geniculata, columna circiter 2 mm. longa ; callus breviter barbatus. *Palea* anguste lanceolata, 2–2·4 mm. longa, nervis breviter excurrentibus. *Antherae* 1 mm. longae.

Belgian Congo : Virunga Mtns.; Mt. Ninagongo, dominating new lava and in ravines intersecting central active cone, 3150–3300 m., *Burtt* 3176.

Agrostis Friesiorum *C. E. Hubbard*, sp. nov.; ab *A. kilimandscharica* Mez, culmis caespitosis erectis vel suberectis prope basin 3-nodibus, spiculis paullo minoribus, glumis leviter inaequalibus, antheris minoribus distinguenda.

Gramen perenne caespitosum, usque ad 70 cm. altum. *Culmi* erecti vel suberecti, graciles, simplices vel e nodis ramosi, basin versus circiter 3-nodes, internodiis inferioribus brevibus, internodio summo elongato demum longe exserto. *Folia* glabra ; vaginae imbricatae, striatae, laeves vel leviter asperulae ; ligulae oblongae,

truncatae, 2–4 mm. longae, scariosae ; laminae lineares, in acumen obtusum attenuatae, usque ad 25 cm. longae, 2–3·5 mm. latae, planae, firmae, nervosae, tenuiter scaberulae. *Panicula* ovata, demum laxa et aperta, usque ad 23 cm. longa et 18 cm. lata ; rhachis inferne laevis, superne leviter scaberula ; rami semi-verticillati vel superne bini, tenuiter filiformes, patentes, apicem versus leviter scaberuli, inferiores usque ad 11 cm. longi, basi per 1·5–5 cm. nudati, superne laxe divisi ; pedicelli laterales 0·5–3 mm. longi. *Spiculae* hiantes, 2·6–3 mm. longae, purpurascentes ; rhachilla plerumque minutissima producta, pubescens, raro usque ad 1 mm. longa. *Glumae* a latere visae anguste lanceolatae et acutae, membranaceae, 1–3-nerves, nervis lateralibus brevibus, carinis superne scaberulae vel gluma superior fere laevis ; superior inferiore paullo brevior. *Lemma* explanatum late ovato-oblongum, truncatum, 1·8–2 mm. longum, hyalino-membranaceum, parte tertia superiore excepta laxe pubescens, 5-nerve, nervis lateralibus breviter excurrentibus ; arista prope basin lemmatis orta, geniculata, 3–5 mm. longa, columna 1·5–2 mm. longa ; callus breviter barbatus. *Palea* lanceolato-oblonga, lemmati subaequilonga, tenuiter 2-nervis. *Antherae* 0·5–0·7 mm. longae. *Caryopsis* 1·3 mm. longa.

KENYA COLONY : Mt. Kenya, lower Bamboo region, *Fries* 1200 (type) ; open spaces in Bamboo forest, 3000–3300 m., *Lyne Watt* 1128.

Agrostis leioclada *C. E. Hubbard*, sp. nov.; *A. Friesiorum* C. E. Hubbard affinis, panicula anguste oblonga contracta, ramis laevibus adscendentibus, spiculis et antheris majoribus differt.

Gramen perenne, usque ad 60 cm. altum. *Culmi* erecti, graciles, simplices, basin versus 3–4-nodes, glabri, laeves, internodio summo demum exserto. *Folia* glabra ; vaginae tenuiter striatae, laeves, imbricatae, inferiores demum in fibros fissae ; ligulae oblongae, scariosae, 4–6 mm. longae, laceratae ; laminae anguste lineares, tenuiter acutae, usque ad 12·5 cm. longae, usque ad 2 mm. latae, planae vel involutae, firmae, scaberulae. *Panicula* anguste oblonga, laxa, 10–25 cm. longa, 2·5 cm. lata, flexuosa ; rhachis gracilis, laevis vel solum prope nodos scaberula ; rami fasciculati, erecti vel adscendentes, tenuiter filiformes vel capillares, laeves, flexuosi, laxe divisi, inferiores usque ad 11 cm. longi et basi per 1·5–3·8 cm. nudati ; pedicelli laeves, laterales 1–4 mm. longi, terminales longiores. *Spiculae* oblongae, demum hiantes, 3–3·5 mm. longae, viridi- et purpureo-variegatae ; rhachilla in setam tenuissimam pilosam usque ad 1·2 mm. producta. *Glumae* a latere visae anguste lanceolatae et acutae, membranaceae, 3-nerves, nervis lateralibus brevibus, carinis superne scaberulae ; inferior superiore paullo longior. *Lemma* explanatum late ovato-oblongum, truncatum, 2–2·4 mm. longum, denticulatum, tenuiter membranaceum, 5-nerve, nervis lateralibus excurrentibus extimis in mucrones usque ad 0·7 mm. longos productis ; arista prope basin lemmatis orta, geniculata, usque ad 5 mm. longa, columna circiter 2 mm. longa ; callus breviter barbatus.

Palea lanceolata, lemmati subaequilonga, nervis breviter excurrentibus. *Antherae* 1–1·3 mm. longae. *Caryopsis* anguste oblonga, 1·3 mm. longa.

TANGANYIKA TERRITORY : north slopes of Mt. Rungwe, forest margins, 2040–2240 m., *St. Clair-Thompson* 940.

Agrostis gracilifolia *C. E. Hubbard*, sp. nov.; affinis *A. Volkensii* Stapf, sed culmis basin versus plerumque ramosis 2–5-nodibus, foliorum laminis laevibus, spiculis minoribus differt.

Gramen perenne dense caespitosum, usque ad 50 cm. altum ; innovationes intravaginales. *Culmi* erecti, gracillimi, basin versus 2–5-nodes et ramosi, vel simplices, glabri, laeves, internodio summo elongato demum longe exserto. *Folia* glabra ; vaginae imbricatae, pallidae, laeves ; ligulae oblongae, truncatae vel obtusae, 1–4 mm. longae, membranaceae ; laminae filiformes, setaceae, apice acutae vel subobtusae, usque ad 20 cm. longae, 0·25–0·5 mm. diametro, arcte convolutae vel involutae, explanatae usque ad 1·2 mm. latae, erectae, rigidiusculae, laeves. *Panicula* aperta, 3·8–12·5 cm. longa, 0·8–3·8 cm. lata, lanceolata vel ovata ; rhachis laevis vel superne minute scaberula ; rami 2–5-nati, tenuiter filiformes vel capillares, minute scaberuli vel fere laeves, trichotomo-divisi, spiculis approximatis, longiores basi per 1·5–2·5 cm. nudati, inferiores usque ad 3·8 cm. longi ; pedicelli valde inaequales, 0·5–2·5 mm. longi, scaberuli. *Spiculae* lanceolatae, demum late hiantes, 2·4–2·5 mm. longae, virides vel purpureae ; rhachilla pilosa, usque ad 0·5 mm. longa. *Glumae* aequales vel subaequales, a latere visae lanceolatae et acutae, firme membranaceae, carinis superne sparse scaberulae : inferior 1–3-nervis ; superior 3-nervis. *Lemma* explanatum late ovatum vel oblongo-ovatum, anguste truncatum, 1·8 mm. longum, tenuiter membranaceum, 5-nerve, nervis lateralibus breviter excurrentibus, lateribus sparse pubescens vel glabrum, asperulum ; arista prope basin lemmatis orta, geniculata, 3–4 mm. longa, columna 1·5 mm. longa ; callus brevissime barbatus. *Palea* oblongo-lanceolata, 1·5–1·6 mm. longa. *Antherae* 0·6–1 mm. longae. *Caryopsis* 1·2 mm. longa.

UGANDA : Mt. Elgon, Bamboo zone, frequent, 3000 m., *Dummer* 3475 ; dominant grass in the bunch grass meadows, 3300–3900 m., *Liebenberg* 1689 (type) ; crater, cliff edges, 3900 m., *Dummer* 3334.

Agrostis dissitiflora *C. E. Hubbard*, sp. nov.; *A. Volkensii* Stapf affinis, foliorum laminis marginibus scaberulis exceptis laevibus arcte convolutis, panicula aperta, ramis rigidioribus, lemmate lateribus laxe vel sparse pubescente distinguitur.

Gramen perenne dense caespitosum, 5–32 cm. altum ; innovationes intravaginales. *Culmi* erecti, graciles vel gracillimi, simplices, prope basin 1-nodes, glabri, laeves, internodio summo demum longe exserto. *Folia* glabra ; vaginae arcte appressae, persistentes, pallidae, laevissimae ; ligulae rotundato-obtusae, 0·5–2 mm. longae, membranaceae ; laminae filiformes, setaceae, apice subacutae vel

obtusae, usque ad 10 cm. longae, arcte convolutae, 0·25–0·5 mm. diametro, erectae, rigidiusculae, marginibus scaberulae, ceterum laeves. *Panicula* lanceolata, laxa, aperta, 2–10 cm. longa, 1–3 cm. lata, erecta, rigidiuscula ; rhachis gracillima, prope nodos asperula, ceterum laevis ; rami 2–3-nati, oblique patentes, tenuiter filiformes, rigidiusculi, laeves, longiores basi per 0·5–1·3 cm. nudati, superne laxe divisi, inferiores usque ad 4 cm. longi ; pedicelli fere laeves vel leviter scaberuli, valde inaequales, 0·5–4 mm. longi. *Spiculae* laxe dispositae, anguste ellipticae vel oblongae, demum hiantes, 2·5–3 mm. longae, purpureae vel viridi-variegatae ; rhachilla in setam pilosam brevem producta. *Glumae* aequales vel subaequales, a latere visae anguste lanceolatae et acutae, firme membranaceae, carinis apicem versus minute scaberulae, 1–3-nerves, nervis lateralibus brevibus. *Lemma* explanatum late ovato-oblongum, truncatum, 1·8–2 mm. longum, hyalino-membranaceum, 5-nerve, nervis lateralibus breviter excurrentibus, lateribus laxe vel sparse pubescens ; arista prope basin lemmatis orta, leviter geniculata, 3–4 mm. longa, columna 1·5–2 mm. longa ; callus breviter barbatus. *Palea* lanceolato-oblonga, 1·5 mm. longa. *Antherae* 0·6 mm. longae. *Caryopsis* 1·5 mm. longae.

Kenya Colony : Mt. Kenya, upper Bamboo region, in damp grassland, 2800 m., *Fries* 1284 (type) ; alpine region, 3500 m., *Fries* 1365, 1374 ; lower alpine region, *Fries* 1386.

Agrostis leptophylla *C. E. Hubbard*, sp. nov.; ab *A. Volkensii* Stapf, foliorum laminis marginibus scaberulis exceptis laevibus gracilioribus, spiculis majoribus, glumis tenuiter acutis 3-nervibus, lemmate sparse pubescente vel glabro distinguenda.

Gramen perenne dense caespitosum, 10–60 cm. altum ; innovationes intravaginales. *Culmi* erecti, gracillimi, simplices, enodes, glabri, laeves. *Folia* glabra ; vaginae basi culmorum dense obtectae, pallidae, laevissimae ; ligulae anguste oblongae, obtusae, 1–4 mm. longae, demum laceratae, membranaceae ; laminae filiformes, setaceae, obtusae, 2·5–22 cm. longae, 0·3–0·5 mm. diametro, arcte involutae vel convolutae, erectae, rigidiusculae, estriatae, marginibus scaberulis exceptis laeves. *Panicula* laxa, erecta, 2·5–15 cm. longa, 0·8–4 cm. lata ; rhachis gracillima, laevis vel fere laevis ; rami tenuiter filiformes vel capillares, laeves vel sparse scaberuli, flexuosi, fasciculati vel bini, longiores basi per 1–2·5 cm. nudati, superne laxe divisi, inferiores usque ad 5 cm. longi ; pedicelli inaequales, 0·5–7 mm. longi, sparse scaberuli. *Spiculae* anguste oblongae, demum late hiantes, 3·3–4·5 mm. longae, purpureae ; rhachilla breviter producta, pilosa. *Glumae* aequales, vel superior inferiore paullo brevior, a latere visae anguste lanceolatae, carinis apicem versus minute scaberulae, firme membranaceae, 3-nerves. *Lemma* explanatum ovato-oblongum, anguste denticulato-truncatum, 2·4–3 mm. longum, tenuiter membranaceum, prope margines sparse pubescens vel glabrum, 5-nerve, nervis lateralibus excurrentibus extimis in mucrones usque ad 0·6 mm. longos productis ; arista

prope basin lemmatis orta, geniculata, 4–5 mm. longa, columna 2 mm. longa ; callus breviter et sparse barbatus. *Palea* oblongo-lanceolata, 2 mm. longa, nervis minute excurrentibus. *Antherae* 1·5 mm. longae. *Caryopsis* oblonga, 1·5 mm. longa.

Uganda : Mt. Elgon, alpine zone, 3300–3900 m., *Johnston* 842, 876 (type) ; crater, moorland, one of the dominant grasses, 4050 m., *Dummer* 3339 ; 4200 m., *Dummer* 3376.

Agrostis bryophila *C. E. Hubbard*, sp. nov.; *A. leptophyllae* C. E. Hubbard affinis, culmis et innovationibus laxiuscule caespitosis, foliorum laminis angustissime linearibus involutis vel planis latioribus, pulvinis atris in axillis ramorum et ramulorum, lemmate glabro differt.

Gramen perenne caespitosum, usque ad 35 cm. altum ; innovationes intravaginales. *Culmi* e basi gracili plurinodi erecti, supra basin simplices et circiter 1-nodes, glabri, laeves, internodio summo elongato demum longe exserto. *Folia* glabra ; vaginae imbricatae, laxiusculae, pallidae, laeves ; ligulae truncatae vel obtusae, 1–1·5 mm. longae, membranaceae ; laminae angustissime lineares, subsetaceae, apice acutae vel subacutae, 4–10 cm. longae, involutae vel explanatae et usque ad 2 mm. latae, erectae, rigidiusculae, supra prominenter nervosae, laeves. *Panicula* erecta, laxa, 4–7·5 cm. longa, 1·3–2 cm. lata ; rhachis gracilis, rigidiuscula, laevis vel superne leviter scaberula ; rami 2–3-nati, adscendentes vel leviter patentes, rigidiusculi, basi nudati, superne laxe di- vel tri-chotomodivisi, laeves vel leviter scaberuli, inferiores usque ad 3·5 cm. longi ; pedicelli valde inaequales, 1–5 mm. longi. *Spiculae* lanceolatae, demum hiantes, 3–4 mm. longae, purpurascentes vel virides ; rhachilla producta, usque ad 0·5 mm. longa, minute pilosa, lemma aristatum raro gerens. *Glumae* aequales vel superior inferiore paullo brevior, a latere visae anguste lanceolatae, acutae, firme membranaceae vel basin versus coriaceae, carinis apicem versus minute scaberulae, ceterum laeves, 3-nerves vel inferior 1-nervis. *Lemma* explanatum late oblongum vel ovato-oblongum, denticulato-truncatum vel minute 4-dentatum, 2·5 mm. longum, tenuiter membranaceum, glabrum, 5-nerve, nervis lateralibus breviter excurrentibus ; arista in parte quarta inferiore orta, leviter geniculata, 4–5 mm. longa, columna 2 mm. longa ; callus sparse puberulus. *Palea* oblongo-lanceolata, 2·5 mm. longa. *Antherae* 1mm. longae. *Caryopsis* 2 mm. longa.

Uganda : Mt. Ruwenzori, *Henderson* ; 3750 m., *Humphreys* 520 ; Bukuku Valley, 3240 m., *Eggeling* 1288 ; in moss, 3750 m., *Fishlock and Hancock* 111 (type) ; Namwanda Valley, on banks of R. Namwamba, 3120 m., *Taylor* 2972 ; dominant in parts of the swamp, 3900 m., *Taylor* 3010.

Agrostis Uhligii *C. E. Hubbard*, sp. nov.; affinis *A. alpicolae* Hochst., sed culmis erectis et innovationibus dense caespitosis, lemmate piloso, palea lemmati aequilonga bimucronulata differt.

Gramen perenne dense caespitosum ; innovationes intravaginales. *Culmi* erecti, graciles, simplices, basi 1-nodes, prope paniculam asperuli, ceterum laeves. *Folia* glabra ; vaginae laeves ; ligulae oblongae, obtusae, denticulatae, 2-6 mm. longae ; laminae angustissime lineares, subsetaceae, apice obtusae, usque ad 15 cm. longae, conduplicatae vel conduplicato-involutae, explanatae usque ad 2 mm. latae, erectae, rigidiusculae, asperulae. *Panicula* lanceolata vel anguste ovata, laxa, 5–11 cm. longa, usque ad 2·5 cm. lata ; rhachis inferne laevis ; rami oblique patentes, subcapillares, flexuosi, scaberuli vel fere laeves, sparse divisi, paucispiculati, inferiores fasciculati, usque ad 4·5 cm. longi, superiores plerumque bini ; pedicelli inaequales, 2–12 mm. longi. *Spiculae* oblongae, demum hiantes, 4–5 mm. longae, purpureo-tinctae ; rhachilla usque ad 1 mm. producta, pubescens, nonnunquam setam tenuem scaberulam usque ad 2 mm. longam gerens. *Gluma* a latere visae anguste lanceolatae, acutae, firme membranaceae, carina superne scaberulae, 3-nerves ; inferior superiore paullo longior. *Lemma* explanatum oblongo-ovatum, denticulato-truncatum, 2·6–3 mm. longum, tenuiter membranaceum, parte tertia superiore excepta pilosum, 5-nerve, nervis lateralibus breviter excurrentibus ; arista prope basin lemmatis orta, leviter geniculata, usque ad 5 mm. longa, columma 2 mm. longa ; callus dense et breviter barbatus. *Palea* lanceolata, lemmati aequilonga, 2-nervis, nervibus breviter excurrentibus. *Antherae* circiter 1 mm. longae.

Tanganyika Territory : Mt. Meru, 3480–3780 m., *Uhlig* 610 (type), 1068.

Agrostis Uhligii *C. E. Hubbard* var. **contracta** *C. E. Hubbard*, var. nov.; a typo culmis brevioribus usque ad 16 cm. altis, ligulis brevioribus 1·5–2 mm. longis, foliorum laminis filiformibus setaceis usque ad 5 cm. longis convolutis vel planis et circiter 1 mm. latis, panicula lineari contracta usque ad 5 cm. longa circiter 0·6 mm. lata, spiculis 3·5–4 mm. longis, glumis 1–3-nervibus differt.

Tanganyika Territory : Mt. Kilimanjaro, 3000 m., *Grote* 6320 ; foot of Kibo, 4800 m., *Uhlig* 71 (type) ; Mt. Meru, 3780 m., *Uhlig* 613 (in part).

Agrostis sclerophylla *C. E. Hubbard*, nom. nov. *Sporobolus alpicola* Hochst. ex A. Rich. Tent. Fl. Abyss. **2**, 395 (1851), non *Agrostis alpicola* Hochst. (1855). *Vilfa alpicola* Steud. Syn. Pl. Glum. **1**, 154 (1854). *Agrostis depressa* Mez ex Pilger in Notizbl. Bot. Gart. Berlin, **9**, 510 (1926), in obs., non Vasey (1886).

Distr. Abyssinia : Samen ; Mt. Silke, at the summit, between rocks, *Schimper* 669.

New Species from West Tropical Africa.

C. E. Hubbard.

Eragrostis chalarothyrsos *C. E. Hubbard*, sp. nov. ; affinis *E. paniciformi* (A.Br.) Steud., sed culmis validioribus altioribus

4–6-nodibus, panicula majore, lemmatibus acuminatis a latere visis ovato-ellipticis vel ellipticis, palearum carinis dense scaberulis, caryopside grisea delicate reticulata differt.

Gramen perenne, caespitosum, 0·9–1·5 m. altum. *Culmi* erecti, validi, teretes vel uno latere sulcati, simplices vel inferne ramosi, 4–6-nodes, glabri, laeves. *Folia* glabra ; vaginae internodiis breviores, laeves ; ligulae ad seriem ciliorum minutorum redactae ; laminae lineares, in acumen tenue longe attenuatae, usque ad 30 cm. longae et 6 mm. latae, siccitate convolutae, erectae, rigidae, supra nervis asperulae, subtus laeves. *Panicula* elliptica, laxissima, usque ad 40 cm. longa et 25 cm. lata ; rhachis glabra, superne flexuosa et scaberula ; rami solitarii, patentes, laxissime divisi, flexuosi, graciles, scabridi ; pedicelli laterales 2–10 mm. longi, terminales 6–18 mm. longi. *Spiculae* laxissime dispositae, oblongae, 6–12 mm. longae, 3–3·5 mm. latae, lateraliter compressae, pallide griseae, 12–30-florae ; rhachilla persistens, glabra, internodiis brevissimis. *Glumae* delapsae. *Lemmata* arcte imbricata, a latere visa ovato-elliptica, acuta, acuminata, explanata late elliptica, 2–2·4 mm. longa, chartacea, asperula. *Paleae* deciduae, ellipticae, obtusae, 2 mm. longae, tenuiter membranaceae, carinis dense scaberulis. *Antherae* 1 mm. longae. *Caryopsis* oblonga, teres, 1 mm. longa, grisea, delicate reticulata.

Sierra Leone : Northern Territories ; Mange, in grassfields along the Little Scarcies River, *Glanville* 240.

Eragrostis Barteri *C. E. Hubbard*, sp. nov. ; ab *E. gangetica* (Roxb.) Steud., habitu annuo, culmis geniculato-adscendentibus 6–8-nodibus, lemmatibus longioribus a latere visis oblongo-lanceolatis vel oblique lanceolatis differt.

Gramen annuum, usque ad 45 cm. altum. *Culmi* geniculato-adscendentes, e nodis inferioribus radicantes, moderate graciles, simplices vel basin versus ramosi, circiter 6–8-nodes, prope nodos pruinosi, glabri, laeves. *Foliorum vaginae* internodiis longiores vel aequilongae, glabrae, laeves ; ligulae truncatae, usque ad 0·4 mm. longae, minutissime ciliatae ; laminae lineares, in acumen tenue attenuatae, usque ad 18 cm. longae et 5 mm. latae, planae vel siccitate convolutae, glabrae, nervis asperulae. *Panicula* oblonga, contracta, usque ad 20 cm. longa et 7 cm. lata ; rhachis glabra, laevis ; rami solitarii, erecti vel leviter patentes, gracillimi, flexuosi, laxe divisi, superne scaberuli, inferiores usque ad 8 cm. longi ; pedicelli laterales 0·5–2 mm. longi. *Spiculae* oblongae, lateraliter compressae, 6–13 mm. longae, 2–3 mm. latae, 10–20-florae, stramineae et purpureo-tinctae ; rhachilla persistens, glabra. *Glumae* lanceolatae, acutae, membranaceae, 1-nerves, carina superne scaberulae ; inferior 2·5–2·8 mm. longa ; superior 2·8–3·2 mm. longa. *Lemmata* a latere visa oblongo-lanceolata vel oblique lanceolata, explanata oblongo-ovata vel ovata, acuta vel subobtusa, 3–3·3 mm. longa, firme membranacea, glabra. *Paleae* deciduae,

oblongae, truncatae, 2–2·8 mm. longae, tenuiter membranaceae, carinis scaberulis. *Antherae* 1 mm. longae.

Northern Nigeria: Nupe, in cultivated ground, *Barter* 877.

Eragrostis Glanvillei *C. E. Hubbard*, sp. nov.; affinis *E. invalidae* Pilger, sed culmis validioribus, foliorum laminis latioribus planis vel siccitate convolutis, vaginis inferioribus plerumque pilosis, paleis explanatis late ellipticis, alis latioribus differt.

Gramen perenne, dense caespitosum, circiter 1 m. altum. *Culmi* erecti vel leviter geniculati, moderate validi vel graciles, simplices, 3–5-nodes, glabri, laeves. *Foliorum vaginae* internodiis plerumque longiores, inferiores solutae, pilis patulis laxe villosae vel glabrescentes, superiores glabrae, laeves; ligulae ad seriem ciliorum minutorum redactae; laminae lineares, in acumen tenue durum attenuatae, usque ad 30 cm. longae et 6 mm. latae, planae vel siccitate convolutae, supra nervis asperulae et pilis debilibus laxe pilosae vel glabrae, subtus glabrae et laeves. *Panicula* late elliptica vel oblonga, laxa, nutans, usque ad 25 cm. longa et 12 cm. lata; rhachis nodis inferioribus pubescens, superne scaberula; rami solitarii, gracillimi, laxe divisi, scaberuli, usque ad 12 cm. longi; pedicelli 3–25 mm. longi, capillares, scaberuli. *Spiculae* ovatae vel oblongae vel elliptico-oblongae, 6–14 mm. longae, 3·5–5·5 mm. latae, lateraliter compressae, 10–30-florae, stramineae vel pallide purpureotinctae; rhachilla persistens (?), glabra, internodiis brevissimis. *Glumae* explanatae lanceolatae, acutae, membranaceae, subaequales, 2–3 mm. longae, 1-nerves, carina scaberulae. *Lemmata* a latere visa anguste lanceolata, acuta, explanata lanceolata, 3–3·3 mm. longa, firme membranacea, glabra, carina apicem versus minute scaberula. *Paleae* deciduae, late ellipticae, acuminatae, 2·5–3 mm. longae, carinis late alatis, alis 0·5–0·6 mm. latis. *Antherae* 1 mm. longae. *Caryopsis* ellipsoidea, 1–1·3 mm. longa.

Sierra Leone: near Kayihi, on granite outcrop, 30 m., *Glanville* 426 (type).

Northern Nigeria: Naraguta, on plains, *Lely* 450.

Eragrostis Pobeguinii *C. E. Hubbard*, sp. nov.; affinis *E. denudatae* Hack., sed culmis plus minusve pilosis, panicula lineari, ramis erectis, glumis angustioribus paullo longioribus, lemmatibus laxioribus angustioribus acutis vel subacutis differt.

Gramen perenne, caespitosum, usque ad 40 cm. altum. *Culmi* erecti, graciles, simplices, 1–2-nodes, sparse et appresse pilosi vel glabrescentes. *Folia* plerumque basalia; vaginae tenuiter striatae, arcte appressae, internodiis breviores, laxe pilosae vel fere glabrae; ligulae ad seriem ciliorum redactae; laminae anguste lineares, apice tenuissimae et flexuosae, usque ad 20 cm. longae, planae vel convolutae, usque ad 2 mm. latae, rigidiusculae, striatae, pilis e tuberculis minutis ortis pilosae. *Panicula* angusta, linearis, 8–12 cm. longa, 0·7–1 cm. lata, erecta, contracta, interrupta, superne simplex; rhachis appresse pilosa vel glabra; rami erecti, solitarii, gracillimi,

scabridi, inferiores laxe 2–4-spiculati, usque ad 3 cm. longi, superiores 2–1-spiculati; pedicelli laterales 1–2 mm. longi, terminales usque ad 12 mm. longi. *Spiculae* oblongae, lateraliter valde compressae, 7–18 mm. longae, 3·5–4·5 mm. latae, erectae vel oblique erectae, 8–26-florae, flavido-virides; rhachilla persistens (?), laevis. *Glumae* membranaceae; inferior explanata lanceolato-oblonga, obtusa vel acuta, 1·5–2·8 mm. longa, 1-nervis; superior explanata lanceolato- vel ovato-oblonga, acuta, 2–3 mm. longa, 3-nervis. *Lemmata* laxe imbricata, a latere visa oblique et anguste ovata, acuta, explanata late ovata, 3–3·2 mm. longa, firme membranacea, 3–nerve, glabra, carina apicem versus scaberula, ceterum laeve. *Paleae* deciduae, oblongae, truncatae, circiter 3 mm. longae, carinis anguste alatis, alis scaberulis. *Antherae* 1–1·3 mm. longae.

French Guinea: Timbo, June 1902, *Pobéguin* 1092.

Leersia triandra *C. E. Hubbard*, sp. nov.; a *L. monandra* Sw., culmis e basi prostrata nodis radicantibus geniculato-adscendentibus, ligulis brevissimis, spiculis pilis minutis rigidis appressis sparse praeditis, antheris tribus differt.

Gramen perenne (?), usque ad 30 cm. altum. *Culmi* e basi prostrata nodis radicantibus geniculato-adscendentes, graciles, debiles, simplices, multinodes, glabri, laeves. *Foliorum vaginae* internodiis plerumque breviores, superne carinatae, marginibus ciliolatae, ceterum glabrae, laeves; ligulae brevissimae, truncatae, membranaceae; laminae lineares, tenuiter acutae, usque ad 6 cm. longae et 4 mm. latae, planae, marginibus ciliolatae, ceterum glabrae. *Panicula* angusta, gracillima, laxa, pallida, 5 cm. longa, 0·6 cm. lata; axis primarius et rami tenuiter filiformi; rami erecti, solitarii, inferne nudati, superne 1–3 racemos gerentes, asperuli, usque ad 3 cm. longi; pedicelli 0·5–1·5 mm. longi. *Spiculae* late oblongo-ellipticae, 2 mm. longae, circiter 1 mm. latae, pilis rigidis minutis appressis sparse praeditae. *Lemma* late semi-ellipticum vel elliptico-oblongum, oblique subacutum, tenuiter coriaceum, 5-nerve. *Palea* lemmati subsimilis sed eo multo angustior. *Antherae* 3, 1 mm. longae.

Sierra Leone: Northern Province; near Konta, between Kasokora and Bumban, in marsh, rare, August 1928, *Deighton* 1241.

Monocymbium lanceolatum *C. E. Hubbard*, sp. nov.; a *M. ceresiiformi* (Nees) Stapf, culmis e basi elongata procumbente geniculato-adscendentibus multinodibus, foliorum laminis lanceolatis latioribus brevioribus basi rotundatis, spatheolis angustioribus, pedunculis longioribus, racemis demum lateraliter exsertis, spicularum sessilium gluma inferiore 9–15-nervi distinguendum.

Gramen perenne, usque ad 1·2 m. altum. *Culmi* e basi elongata multinodi procumbente geniculato-adscendentes, e nodis inferioribus radicantes, moderate validi, teretes, multinodes, internodiis 2–5·5 cm. longis, duri, infra inflorescentiam simplices vel sparse ramosi, glabri, laeves. *Foliorum vaginae* internodiis breviores, teretes,

striatae, purpureo-suffusae, glabrae et laeves vel superne pilis patulis e tuberculis ortis villosae vel pilosae ; ligulae rotundato-truncatae, usque ad 1 mm. longae, membranaceae, glabrae ; laminae lanceolatae, basi rotundatae, acutae, 4·5–9 cm. longae, 1–2 cm. latae, planae, firmae, subtus glaucae, glabrae vel marginibus basin versus laxe longe ciliatae, marginibus supra medium spinuloso-scabridae, ceterum laeves, costa media tenuissima, nervis lateralibus 14–16. *Inflorescentia* spathata, angusta, laxissima, 20–45 cm. longa, nutans ; axis primarius gracillimus, uno latere sulcatus, prope nodos pilosus ; rami filiformes, apicem versus plus minusve pilosi, ceterum glabri, laeves, elongati, simplices vel sparse divisi ; spatheolae anguste cymbiformes, acutae, 2–3 cm. longae, a latere visae 1·5–2 mm. latae, tenuiter chartaceae, rubro-brunneae, glabrae vel basin versus pilis paucis praeditae, laeves ; pedunculi tenuiter filiformes, 4–18 mm. longi, prope apicem puberuli. *Racemi* 12–22 mm. longi, 5–10-aristati, demum lateraliter exserti, straminei ; rhacheos internodia 1·5 mm. longa, breviter ciliata ; pedicelli internodiis similes, 2 mm. longi. *Spiculae sessiles* lanceolatae, vel lanceolato- vel anguste elliptico-oblongae, subacutae, 3·5–4 mm. longae, fere glabrae vel pilis albis brevibus plus minusve villosae. *Gluma inferior* 9–15-nervis, carinis supra medium spinuloso-ciliolata ; gluma superior lanceolata, minutissime biloba, marginibus molliter ciliolatis. *Anthoecium inferum* : lemma oblongum, truncatum vel emarginatum, 3–3·5 mm. longum, enerve, ciliolatum. *Anthoecium superum* : lemma lineare, 2·5–3 mm. longum, usque medium bifidum, lobis angustis acutis, arista geniculata, 12–16 mm. longa, scaberula ; antherae 2 mm. longae. *Spiculae pedicellatae* anguste lanceolato-oblongae vel lineari-oblongae, 3–4·5 mm. longae, fere glabrae vel plus minusve breviter villosae ; gluma inferior 13–15-nervis ; gluma superior 5-nervis.

Sierra Leone : between Mamaria and Kulufaga, *Glanville* 337 (type) ; Fontane, open places in bush country, *Glanville* 100.

Glanville states that this grass is frequent in the Mamaria and Kulufaga area, in sheltered moist but open situations, such as are found by the riverside in damp valleys. The vegetation there is secondary bush ; he has not seen it in orchard bush.

New Species from Uganda.

J. D. Snowden & C. E. Hubbard.

Saccolepis Johnstonii *C. E. Hubbard et Snowden*, sp. nov.; a *S. rigente* (Mez) Chevalier, culmis 4–5-nodibus, auriculis brevioribus, spiculis minoribus 3–3·5 mm. longis distinguenda.

Gramen perenne, usque ad 1 m. altum, e rhizomate modice valido ortum. *Culmi* erecti vel suberecti, validiusculi, prope basin usque ad 4 mm. lati, 4–5-nodes, simplices, teretes, glabri, laeves. *Folia* glabra ; vaginae striatae, laeves, apice plerumque auriculatae, auriculis 2–3 mm. longis, inferiores internodiis longiores, superiores iis multo breviores ; ligulae truncatae, membranaceae, 0·5–1 mm. longae, auriculis adnatae ; laminae lineares, tenuiter acutae, usque

ad 25 cm. longae, 3–7 mm. latae, planae, firmae, laeves, virides, costa media graciliuscula. *Panicula* spiciformis, longe exserta, cylindrica, densa, 4–8 cm. longa, 6–7 mm. lata ; rhachis laevis ; pedicelli 0·5–1·5 mm. longi, apice patelliformes. *Spiculae* oblique ovatae vel oblique elliptico-ovatae, acutae, 3–3·5 mm. longae, 1–1·5 mm. latae, glabrae, purpureo-tinctae. *Gluma inferior* late ovata, obtusa, tertiam vel dimidiam partem spiculae aequans, 5-nervis, nervis superne minute asperula, tenuiter membranacea ; gluma superior spiculae aequilonga, explanata late ovato-oblonga, obtusa, prominenter 9-nervis, membranacea. *Anthoecium inferum* vel ♂ vel sterile : lemma glumae superiori subsimile ; palea lanceolata, truncata, usque ad 2 mm. longa, hyalina ; antherae 2 mm.longae. *Anthoecium superum*, ♀, elliptico-oblongum, subacutum, 1·8–2 mm. longum, circiter 0·7 mm. latum : lemma et palea demum tenuiter crustacea ; antherae 1·5 mm. longae.

Uganda : Lango District, in low-lying rain-flooded areas, June 1934, *Johnston* 938.

Echinochloa ugandensis *Snowden et C. E. Hubbard*, sp. nov.; affinis *E. stagninae* (Retz.) Beauv, sed habitu annuo, foliorum laminis multo angustioribus, spiculis minoribus differt.

Gramen annuum. *Culmi* erecti, 0·4–1 m. alti, graciles vel validiusculi, compressi, inferne spongiosi, 3–4-nodes, plerumque simplices vel nonnunquam ramosi, glabri laevesque ; nodi inferiores laxe barbati vel glabri. *Foliorum vaginae* laxae, glabrae, laeves, inferiores compressae et carinatae ; ligulae ad seriem ciliorum densorum redactae ; laminae anguste lineares, tenuiter acutae, 10–30 cm. longae, 2–5 mm. latae, planae vel conduplicatae, firmae, glabrae vel minute pubescentes, marginibus cartilagineis scaberulis. *Panicula* erecta, fere recta, linearis, laxa vel densiuscula, 8–20 cm. longa, 1–3·5 cm. lata ; axis primarius gracilis, tenuiter striatus, scabridus vel superne minute et dense scabrido-pubescens. *Racemi* 6–25, solitarii, erecti vel leviter oblique patentes, densi, 4–6 mm. lati, inferiores 1–3 cm. distantes et 2–4 cm. longi, superiores gradatim breviores, summi circiter 1 cm. longi ; rhachis triquetra, 0·2–0·5 mm. lata, angulis dense scabrida, pilis longis rigidis plerumque laxe adspersa ; pedicelli bini vel fasciculati, brevissimi, scabridi. *Spiculae* 4-seriatae, ellipticae vel elliptico-ovatae, cuspidatae vel aristatae, 3–3·5 mm. longae, pallide virides vel purpureo-suffusae. *Glumae* tenuiter membranaceae, nervis scabridae vel hispidulae, inter nervos minute et rigide pubescentes ; inferior late ovata vel oblata, breviter acuminata, mucronulata, 1·5–2 mm. longa, 5–7-nervis, marginibus rigide ciliolata ; superior elliptico-ovata (explanata), caudato-acuminata, spiculae aequilonga. *Anthoecium inferum* ♂ : lemma glumae superiori simile sed in aristam rigidam scabridam usque ad 6 mm. longam attenuatum, 5–7-nerve ; palea carinis scaberula. *Anthoecium superum* : lemma ellipticum, 2·8–3 mm. longum, breviter cuspidatum, coriaceum, apicem versus ciliolatum. *Antherae* 1·8–2 mm. longae.

Uganda : Mengo District, Kyagwe, Bulumage, in pool, 1200 m., *Dummer* 4114 ; Teso District, Abela, Liebenberg 851 (type); Serere, in shallow soil, 1080 m., *Chandler*, 919.

This species is somewhat intermediate between *E. haploclada* Stapf and *E. stagnina* Beauv., but differs from both by being an annual and by its very narrow leaf-blades. It may also be distinguished from *E. haploclada* by the presence of a hairy ligule, the somewhat larger spikelets, longer 5–7-nerved lower glume, and rather looser panicle. *E. ugandensis* agrees with *E. stagnina* in possessing a hairy ligule and in the shape of the panicle, but the spikelets are smaller than in the most reduced forms of that species.

Sorghum castaneum *C. E. Hubbard et Snowden*, sp. nov.; a *S. verticillifloro* (Steud.) Stapf, spiculis sessilibus minoribus late ellipticis vel elliptico-oblongis, gluma inferiore 8–11-nervi, caryopsidibus late obovatis vel obovato-rotundis distinguendum.

Gramen perenne, usque ad 2·4 m. altum. *Culmi* erecti, basin versus 7–8 mm. diametro, robusti, simplices vel ramosi, prope nodos leviter pruinosi, glabri, laeves. *Folia* 6–7 ; vaginae demum internodiis breviores, nodis appresse pubescentes ; ligulae truncatae vel rotundatae, 2–2·5 mm. longae, scariosae, rigide ciliatae ; laminae lineares, basi rotundatae, in apicem tenuem longe attenuatae, usque ad 40 cm. longae et 2·7 cm. latae, planae, virides, nonnunquam leviter glaucae vel purpureo-suffusae, prope ligulam hirsutae, ceterum glabrae, marginibus superne scabridis. *Panicula* lanceolato- vel ovato-oblonga, laxa, nutans, circiter 40 cm. longa et 10–15 cm. lata ; axis primarius angulatus, nodis dense villosulus, ceterum glaber ; rami 2–4-nati vel solitarii, graciles, flexuosi, superne scabridi, basin versus nudati, superne laxe divisi, inferiores usque ad 20 cm. longi. *Racemi* fragiles, 2–5-nodes, usque ad 15 mm. longi ; rhacheos internodia gracillima, 2–3·5 mm. longa, pilis fulvis dense ciliata ; pedicelli internodiis similes. *Spiculae sessiles* late ellipticae vel elliptico-oblongae, obtusae, 4–4·5 mm. longae, 2–2·5 mm. latae, demum castaneae vel atro-brunneae ; callus breviter barbatus. *Glumae* aequales, apice chartaceo excepto coriaceae, pilis fulvis rigidiusculis brevibus appresse hirsutae vel dorso glabrescentes ; inferior dorso leviter convexa, nitens, 8–11-nervis ; superior ovata, acuta, dorso convexa, apicem versus carinata, 7-nervis, marginibus angustis incurvis hyalinis ciliatis. *Lemmata* hyalina, ciliata ; inferius elliptico-ovatum vel ellipticum, 4–4·5 mm. longum, 2-nerve ; superius ovatum vel oblongum, 3 mm. longum, breviter bilobum ; arista 9–11 mm. longa ; palea lanceolata, usque ad 2 mm. longa, ciliata ; lodiculae ciliolatae ; antherae 2·5 mm. longae ; caryopsis obovata vel obovato-rotunda, 2–2·5 mm. longa, 1·5–1·7 mm. lata, plano-convexa. *Spiculae pedicellatae* vel ♂ vel steriles, tarde deciduae, lineari-lanceolatae, subacutae, 4–4·5 mm. longae. *Gluma* inferior 8–9-nervis ; gluma superior 7–8-nervis.

Uganda : Toro District ; Bwamba, Bubandi, in Elephant Grass zone, frequent, 1050 m., *Thomas* 714.

The Genera of the Tribe Arundinelleae.

C. E. Hubbard.

The genera of the *Arundinelleae* have been referred to various tribes and there is still no uniformity in their classification. In 1827, Link (Hort. Berol. **1**, 231) proposed the suborder *Tristeginae* for the genera *Acratherum* Link (=*Arundinella* Raddi), *Tristegis* Nees (=*Melinis* Beauv.), *Arrhenatherum* Beauv., and *Holcus* L. Later Nees (in Hook. & Arnott, Bot. Beech. Voy. 237 : 1836) reduced this suborder to tribal rank, and included in it the genus *Arundinella*. Up to the end of the 19th century many botanists still placed *Arundinella* in the *Tristegineae*, including Bentham (Benth. et Hook. f. Gen. Pl. **3**, 1118 : 1883) and Hackel (Engl. u Prantl, Nat. Pflanzenf. **2**, Abt. 2, 32 : 1887), while the same authors referred the allied genera, *Tristachya* Nees and *Trichopteryx* Nees to the tribe *Aveneae*. Stapf in preparing the account of the *Gramineae* for the Flora Capensis, realized the close relationship existing between *Arundinella*, *Trichopteryx* and *Tristachya*, and grouped them together in a new tribe—*Arundinelleae* (Dyer, Fl. Cap. **1**, 314 : 1898). The *Tristegineae* did not find a place in his scheme of classification, as *Tristegis* (= *Melinis*), the type-genus, was referred to the *Paniceae*. The tribe *Arundinelleae* was adopted by Rendle (Cat. Afr. Pl. Welw. **2**, 214 : 1899) and by Hooker (in Trimen, Fl. Ceyl. **5**, 116 : 1900), whilst more recently Mez (in Fedde, Repert. **17**, 84 : 1921), apparently unaware of Stapf 's proposal, has described it as a new tribe. Janowski (in Mez, Bot. Arch. **1**, 21 : 1922) gives a conspectus of the tribe and includes in it, *Arundinella*, *Thysanolaena*, *Phaenosperma* and *Beckera*, but excludes *Trichopteryx* and *Tristachya*. Three of the above genera are referred by me to other tribes :—*Thysanolaena* to the *Thysanolaeneae*, *Phaenosperma* to the *Stipeae* (following Stapf), and *Beckera* to the *Paniceae* on account of its relationship to *Beckeropsis*. Hitchcock, in his account of the grasses of Ecuador, Peru and Bolivia (Contrib. U.S. Nat. Herb. **24**, 304 : 1927), referred *Tristachya*, *Trichopteryx* and *Arundinella* to the *Melinideae*, but noted that they differed in certain respects from *Melinis* and its allies. Whether or not the *Tristegineae* or *Melinideae* be retained as a distinct tribe for *Melinis* Beauv., *Rhynchelytrum* Nees and *Tricholaena* L. f. is a matter which requires further consideration, but in any case it should not include *Arundinella* and its allies. The latter form a very natural group which may be distinguished from *Melinis* and related genera by the persistent well-developed glumes, awnless and entire lower lemma, and usually awned scaberulous or hairy (rarely glabrous) upper lemma.

Key to the Genera.

*Lemma of the upper floret scabrid or scaberulous, entire, emarginate or minutely and obscurely 2-lobed at the apex, with the lobes muticous or each bearing a capillary bristle, awned or awnless ;

upper floret with a minute obtuse or truncate callus ; anthers 3 ; ovary glabrous ; lower lemma 3–7-nerved ; spikelets green, greyish or purplish, paired or solitary.....1. *Arundinella.*

*Lemma of the upper floret more or less hairy, with the hairs evenly disposed or arranged in transverse rows or tufts, rarely glabrous and then quite smooth, usually conspicuously 2-lobed or 2-fid at the apex, always awned :

Palea of the lower floret thin, usually membranous, linear to narrowly oblong, rarely suppressed ; lower glume usually awnless :

Spikelets mostly paired, rarely solitary or in threes, in the latter case with the spikelets pedicelled and with the lower glume narrowly ovate to broadly ovate-elliptic or ovate-oblong ; anthers 2–3 ; ovary glabrous :

Lemma of the upper floret transversely bearded with 6–8 tufts of hairs, or with a dense row of hairs across the back, or with a tuft of hairs below each lobe, deeply 2-lobed, rather thin :

Lemma of the lower floret 5–11- (rarely 3-) nerved ; lemma of the upper floret transversely bearded with a continuous row of hairs below each lobe or with 6 to 8 tufts of hairs ; anthers 3 ; keels of the palea of the upper floret usually winged, the wings bearing an appendage at the apex ; spikelets mostly greenish or purplish .....2. *Danthoniopsis.*

Lemma of the lower floret 3- (rarely 1-) nerved ; lemma of the upper floret with a tuft of hairs below each lobe and near the margins, its lobes usually bearing a capillary bristle ; anthers 2 ; keels of the palea of the upper floret very narrowly winged and without appendages ; spikelets brown or reddish-brown.....3. *Trichopteryx.*

Lemma of the upper floret evenly pubescent to pilose, or glabrous except for the bearded basal callus, becoming rigid and coriaceous at maturity, shortly 2-lobed, with the lobes awnless ; anthers 2–3 ; keels of the palea of the upper floret without wings or appendages.....4. *Loudetia.*

Spikelets sessile or shortly pedicelled in threes at the ends of the branches of panicles or racemes ; glumes narrowly lanceolate to linear-lanceolate ; anthers 2–3 ; ovary glabrous or hairy ; lemma of the lower floret 3–7-nerved ; palea of the upper floret with wingless unappendaged keels .....5. *Tristachya.*

Palea of the lower floret indurated and thickened between the keels, oblanceolate to linear ; lower glume long-awned ; lemma of the lower floret 5–7-nerved ; lemma of the upper floret with 1 or 2 tufts of hairs below each lobe, the lobes shortly awned ; panicle spike-like.....6. *Gilgiochloa.*

1. **Arundinella** *Raddi*, Agrost. Bras. 37, t.1, fig. 3 (1823).
Species 35–40 ; mainly in tropical and subtropical Asia and America, two each in Africa and Australia, one in Madagascar. Type species : *A. brasiliensis* Raddi=*A. hispida* (Willd.) O. Kuntze.

2. **Danthoniopsis** *Stapf* in Hook. Ic. Pl. **31,** t. 3075 (1916).
Species 8 ; tropical Africa, extending to tropical Arabia, Baluchistan and Sind. Type species : *D. Gossweileri* Stapf=*D. viridis* (Rendle) C. E. Hubbard.

3. **Trichopteryx** *Nees* in Lindl. Nat. Syst. ed. 2, 449 (1836).
Species 7, in tropical and South Africa and Madagascar. Type species : *T. Dregeana* Nees. Lindley spelt the generic name *Trichopteria*, but Nees (Fl. Afr. Austr. 339 : 1841) states that this is a typographical error.

4. **Loudetia** *Hochst. ex Steud.* Syn. Pl. Glum. **1,** 238 (1854).
Species about 40 ; mainly in tropical Africa, extending into South Africa and Madagascar, one in tropical South America. Type species : *L. elegans* Hochst.
The genus *Loudetia* was first proposed by Hochstetter for an Abyssinian grass collected by Schimper. The name *Loudetia elegans* appeared on printed labels with the specimens, and also in a list in Flora, **24,** 1, Intell. 20 (1841), but in each case it was unaccompanied by a description. Later, A. Braun in Flora, **24,** 2, 713 (1841) discussed *Loudetia* and *Tristachya*, and considered that the differences between the two were insufficient to retain them as distinct genera. As the earlier name *Tristachya* Nees was, in his opinion, unsuitable for the species placed under *Loudetia* (e.g. *L. elegans*), he adopted the latter generic name and included *Tristachya* as a section under it. This application of the name *Loudetia* Hochst. by A. Braun was illegitimate, since, with his classification, *Loudetia* was a superfluous name for *Tristachya*. A. Braun, however, validated the name *Loudetia elegans* by giving a brief description of the species. In 1852, De Notaris published the description of a second species, *Loudetia superba* in Ind. Sem. Hort. Genuensis (reprinted in Ann. Sci. Nat. sér. 3, **19,** 369 ; 1853). This epithet is validly published. The valid publication of the generic name *Loudetia* dates from Steudel (Syn. Pl. Glum. **1,** 238 ; 1854), who supplied a generic description (excluding *Tristachya*). The name *Loudetia* Hochst. ex Steud. as used by him is not a later homonym, since it is based on the same type as the illegitimately applied name *Loudetia* A Br. Thus the date of valid publication of the two binomials, *Loudetia elegans* and *L. superba* precedes the date of publication of the generic name *Loudetia*.
The above nomenclatural account has been written in collaboration with Dr. T. A. Sprague.

*Anthoecium inferum ♂; antherarum apices glabri; aristae usque ad 12·5 cm. longae :

Lemma inferius 3-nerve, vel si 5–7-nerve tum callo anthoecii superi truncato vel rotundato-truncato et spiculis usque ad 10 mm. longis ; stamina 2–3 :

Spiculae binae vel solitariae :

Lemma inferius 3-nerve ; lemma superius brevissime bilobum vel integrum .....I. *Eu-Loudetia.*

Lemma superius pilis longis laxe pilosum ; callus truncatus, circiter 0·3 mm. longus ; aristae usque ad 2·5 cm. longae ; gramina perennia arundinacea ; culmi validi ; panicula usque ad 60 cm. longa, dense contracta..... a. *Flammidae.*

Lemma superius pubescens vel glabrescens ; callus pungens, bidentatus, emarginatus vel truncatus, 0·4–2 mm. longus ; aristae plerumque 2·5–12·5 cm. longae ; culmi graciles vel validi :

Gramina perennia, plerumque dense caespitosum ; lemma inferius tres quadrantes spiculae aequans vel spiculae aequilongum ; aristae usque ad 7 cm. longae :

Panicula laxa vel contracta, haud spiciformis, usque ad 15 cm. lata ; rami plus 1 cm. longi :

Antherae 2 ; lemma superius 5–7-nerve ; gluma superior et lemma inferius apice truncata, obtusa vel subacuta :

Anthoecii superi callus truncatus, emarginatus vel bidentatus, 0·4–1 mm. longus..... b. *Typicae.*

Anthoecii superi callus acutus, pungens, 1–2 mm. longus ..... c. *Pungentes.*

Antherae 3 ; lemma superius plerumque 9-nerve ; gluma superior et lemma inferius plerumque acuta vel setaceo-acuta .....d. *Acuminatae.*

Panicula densissima, spiciformis, 6–14 mm. lata ; rami usque ad 6 mm. longi, 4–1-spiculati..... e. *Densispicae.*

Gramina annua ; lemma inferius dimidiam partem vel duos trientes spiculae aequans ; aristae 5–12·5 cm. longae. .....f. *Annuae.*

Lemma inferius 5–7-nerve ; lemma superius conspicue bilobum .....II. *Pleioneura.*

Spiculae apice ramorum per triades fasciculatae ; callus emarginatus, bidentatus vel truncatus ; spiculae 6–9 mm. longae ..... III. *Pseudotristachya.*

Lemma inferius 5–7-nerve ; stamina 3 ; callus pungens, 1·5–5 mm. longus ; spiculae 11–36 mm. longae, ternae, binae vel solitariae ..... IV. *Paratristachya.*

*Anthoecium inferum sterile, palea nulla ; antherae 2, apicibus minutissime hirsutis ; spiculae 2·2–2·7 cm. longae ; aristae usque ad 17·5 cm. longae..... V. *Lophanthera.*

Enumeration of Sections and Subsections of Loudetia.

Sect. I. **Eu-Loudetia** *C. E. Hubbard*, sect. nov. Type : *Loudetia elegans* Hochst. ex A. Br. = *L. simplex* (Nees) C. E. Hubbard.

Subsect. a. **Flammidae** *C. E. Hubbard*, subsect. nov. Species 2; tropical Africa and tropical South America. Type :—*L. flammida* (Trin.) C. E. Hubbard, comb. nov. (*Arundinella flammida* Trin.).

Subsect. b. **Typicae** *C. E. Hubbard*, subsect. nov. Species 8 ; tropical and South Africa and Madagascar. Type : *L. elegans* Hochst. ex A. Br. = *L. simplex* (Nees) C. E. Hubbard.

Subsect. c. **Pungentes** *C. E. Hubbard*, subsect. nov. Species 4 ; tropical and South Africa. Type : *L. Demeusei* (De Wild.) C. E. Hubbard.

Subsect. d. **Acuminatae** *C. E. Hubbard*, subsect. nov. Species 4; tropical and South Africa. Type : *L. acuminata* (Stapf) C. E. Hubbard.

Subsect. e. **Densispicae** *C. E. Hubbard*, subsect. nov. Species 4 ; west tropical Africa. Type : *L. densispica* (Rendle) C. E. Hubbard.

Subsect. f. **Annuae** *C. E. Hubbard*, subsect. nov. Species 3 ; north tropical Africa. Type : *L. hordeiformis* (Stapf) C. E. Hubbard.

Sect. II. **Pleioneura** *C. E. Hubbard*, sect. nov. Species 2 ; South West Africa. Type : *L. ramosa* (Stapf) C. E. Hubbard, comb. nov. (*Trichopteryx ramosa* Stapf).

Sect. III. **Pseudotristachya** *C. E. Hubbard*, sect. nov. Species 7 ; west tropical Africa. Type : *L. ternata* (Stapf) C. E. Hubbard.

Sect. IV. **Paratristachya** *C. E. Hubbard*, sect. nov. Species 5 ; tropical and South Africa. Type : *L. superba* De Not.

Sect. V. **Lophanthera** *C. E. Hubbard*, sect. nov. Species 1, *L. togoënsis* (Pilger) C. E. Hubbard ; north tropical Africa.

5. **Tristachya** *Nees*, Agrost. Bras. 458 (1829).

Species about 25, in tropical and South Africa, Madagascar and tropical America.

The genus *Tristachya* comprises a number of well-defined sections, a key to which is given below, whilst a more complete account of the African species will be given in the next part of the Flora of Tropical Africa.

Key to the Sections of Tristachya.

Pedicelli distincti, 0·5–3 mm. longi ; lemma inferius 3- (raro 5-) nerve ; ovarium glabrum ; triades haud omnino deciduae :

Lemma superius haud transverse barbatum, lobis acutis vel tenuiter acutis muticis :

Glumae glabrae ; callus acutus, pungens ; antherae 3..... I. *Eu-Tristachya.*

Glumae setosae ; callus oblique truncatus, emarginatus vel bidentatus ; antherae 2 ..... II. *Diandrostachya*.

Lemma superius infra lobos pilis erectis dense et transverse barbatum, lobis in setam capillarem scaberulam attenuatis ; callus obtusus vel truncatus ; antherae 3 ; glumae setosae vel glabrae ..... III. *Dilophotriche*.

Pedicelli connati vel fere connati ; lemma inferius plerumque 5–9- (raro 3-) nerve ; ovarium apice villosum, rarissime glabrum (*T. decora* Stapf) ; antherae 3 :

Triades haud omnino deciduae ; anthoecii superi callus gracilis, pungens, 1–3·5 mm. longus :

Lemmatis superioris lobi acuti vel acuminati, mutici ; gluma inferior setulosa vel pilosa ..... IV. *Apochaete*.

Lemmatis superioris lobi in setam capillarem scaberulam longam attenuati ; gluma inferior glabra vel margines versus setosa ..... V. *Dolichochaete*.

Triades facile deciduae ; anthoecii superi callus latus, obtusissimus, usque ad 0·6 mm. longus :

Lemma superius haud transverse barbatum ; spiculae pilis fulvis setosae ; ovarium apice pilosum...VI. *Piptostachya*.

Lemma superius dorso supra medium fasciculis pilorum transverse barbatum ; spiculae pilis albis longis setosae ; ovarium glabrum ..... VII. *Zonotriche*.

Enumeration of the Sections of Tristachya.

Sect. I. **Eu-Tristachya** *C. E. Hubbard*, sect. nov. Species 4 ; tropical America. Type : *T. leiostachya* Nees.

Sect. II. **Diandrostachya** *C. E. Hubbard*, sect. nov. Species 4 ; tropical America and west tropical Africa. Type : *T. chrysothrix* Nees.

Sect. III. **Dilophotriche** *C. E. Hubbard*, sect. nov. Species 3 ; west tropical Africa. Type : *T. tristachyoides* (Trin.) C. E. Hubbard.

Sect. IV. **Apochaete** *C. E. Hubbard*, sect. nov. Species 3 ; tropical and South Africa. Type : *T. hispida* (Linn. f.) K. Schum.

Sect. V. **Dolichochaete** *C. E. Hubbard*, sect. nov. Species 8 ; tropical and South Africa and Madagascar. Type : *T. Rehmannii* Hack.

Sect. VI. **Piptostachya** *C. E. Hubbard*, sect. nov. Species 1 ; *T. inamoena* K. Schum. ; tropical Africa.

Sect. VII. **Zonotriche** *C. E. Hubbard*, sect. nov. Species 1 ; *T. decora* Stapf ; tropical Africa.

6. **Gilgiochloa** *Pilger* in Engl. Bot. Jahrb. **51**, 415 (1914). Species 1, *G. indurata* Pilger ; in Tanganyika Territory.

New Species from South Africa.

H. G. Schweickerdt & C. E. Hubbard.

Brachiaria Schoenfelderi *C. E. Hubbard et Schweickerdt* sp. nov.; affinis *B. poacoidi* Stapf, sed panicula lanceolata vel anguste lanceolata, spiculis dense sericeo-villosis differt.

Gramen annuum, laxe caespitosum, usque ad 75 cm. altum. *Culmi* plerumque geniculato-adscendentes, graciliusculi, teretes, 3–5-nodes, infra medium ramosi, nodos versus pilis debilibus e tuberculis minutis ortis sparse vel laxe pilosi, ceterum glabri laevesque, internodio summo (pedunculo) longe exserto elongato glabro. *Foliorum vaginae* internodiis breviores, laxiusculae, tenuiter striatae, pilis deciduis e tuberculis minutis ortis laxe pilosae vel inferiores tantum tuberculatae ; nodi villosuli ; ligulae ad seriem ciliorum densorum redactae ; laminae lineares, in acumen gracile attenuatae, usque ad 15 cm. longae et 8 mm. latae, planae, flaccidae, pallide virides, pilis albis e tuberculis minutis ortis laxe vel fere glabrae, marginibus cartilagineis scaberulis saepe undulatis et purpureis. *Panicula* ambitu lanceolata vel anguste lanceolata, subsecunda, laxiuscula, usque ad 15 cm. longa, 2–3·5 cm. lata ; axis primarius pubescens vel demum glaber ; rami oblique erecti, pubescentes, solitarii, inferiores usque ad 6·5 cm. longi, basin versus per 1–2 cm. nonnunquam nudati, simplices vel inferne ramosi, superiores breviores, simplices vel fere simplices. *Racemi* secundi, densi, usque ad 3·5 cm. longi, simplices vel longiores compositi ; rhachis filiformis, subtriquetra, pubescens, circiter 0·25 mm. lata ; pedicelli solitarii, brevissimi, appressi, apice discoidei. *Spiculae* biscriatae, densae, imbricatae vel contiguae, ellipticae vel ovato-ellipticae, obtusae, 2–2·5 mm. longae, pallide virides vel purpureo-tinctae, pilis longis argenteo-albis sericeis appressis vel demum patentibus e tuberculis minutissimis ortis dense villosae. *Glumae* valde inaequales ; inferior lanceolata, ovata vel irregulariter quadrata, circiter 1 mm. longa, 1–2-nervis vel enervis, tenuiter membranacea, dense et breviter pilosa ; superior spiculae aequilonga vel paullo brevior, explanata elliptico-ovata, obtusa, 5-nervis, membranacea, pilis usque ad 1·5 mm. longis praedita. *Anthoecium inferum* vel sterile vel ♂ (?) : lemma glumae superiori subsimile sed spiculae aequilongum ; palea elliptica, rotundato-obtusa, lemmati fere aequilonga, membranacea, apice marginibusque inflexis pubescentibus vel fere glabris. *Anthoecium superum* ♀, oblongum, rotundato-obtusum, pallidum, usque ad 2 mm. longum, glabrum, nitens, laeve : lemma et palea tenuiter coriacea ; antherae 1 mm. longae.

South West Africa : Grootfontein, on red soil near Gross Huis, March 1931, *Schoenfelder* S. 584 (type) ; black vlei soil, Feb. 1934, *Schoenfelder* S.558 ; Otjikoto, April 1923, *Barnard* ; Tsumeb, Nosibpad, April 1934, *Dinter* 7438.

Rhynchelytrum drakensbergense *C. E. Hubbard et Schweickerdt*, sp. nov.; a *R. tomentoso* (Rendle) Stapf et Hubbard, foliorum vaginis

sparse vel laxe pilosis, laminis linearibus brevioribus angustioribus erectis, lemmate inferiore aristato, palea inferiore apice ciliolata distinguendum.

Gramen perenne, laxe caespitosum, usque ad 45 cm. altum. *Culmi* erecti vel geniculato-adscendentes, e nodis inferioribus radicantes, graciles, basin versus ramosi, circiter 6–7-nodes, nodos et paniculam versus pubescentes vel pilosi. *Foliorum vaginae* plerumque internodiis longiores, pilis patentibus e tuberculis minutis ortis sparse vel laxe pilosae ; ligulae ad seriem ciliorum densorum redactae ; laminae lineares, apice subpungentes, 5–12 cm. longae, 2–5 mm. latae, planae vel siccitate involutae, rigidiusculae, virides vel supra atropurpureae, subtus pilis brevibus e tuberculis minutis ortis praeditae, tenuiter striatae et inter strias asperulae, supra laeves et sparse pilosae vel glabrae. *Panicula* densa, anguste oblonga vel lanceolata, circiter 8 cm. longa et 1·5 cm. lata ; rhachis flexuosa, dense et molliter pilosa ; rami solitarii, ut rhachis pilosi, usque ad 2·5 cm. longi ; pedicelli inaequales, laterales brevissimi, terminales usque ad 2 mm. longi, omnes pilosi et apice pilis albis usque ad 3 mm. longis gerentes. *Spiculae* oblongae vel obovato-oblongae, 2·6–3 mm. longae, villosulae. *Glumae* approximatae ; inferior plerumque ad seriem ciliorum brevissimorum redacta, raro ut squama minutissima hyalina evoluta ; superior spiculam aequans, explanata late elliptico-oblonga, obtuse et brevissime biloba, firme membranacea, 7-nervis, ciliata, pilis purpureis vel albis appressis dense sericeo-pilosa, aristata, arista usque ad 1·5 mm. longa. *Anthoecium inferum* ♂ : lemma glumae superiori subsimile, sed explanatum late oblongum, 5-nerve, arista usque ad 6 mm. longa ; palea circiter 2 mm. longa, apice ciliolata. *Anthoecium superum* ♀ : lemma explanatum late elliptico-ovatum, 2–2·5 mm. longum, apice ciliolatum, ceterum glabrum, tenuissime 5-nerve ; palea lemmate brevior. *Antherae* 1·3–2 mm. longae.

Transvaal: cultivated at the Rietondale Pasture Experiment Station, originally from Sabie Camp, on mountains, April 1935, *Pole Evans and van Rensburg in Nat. Herb. Pretoria* 19797 (type) ; between Lydenburg and Dullstroom, April 1934, *Pole Evans in Nat. Herb. Pretoria* 19797A.

Loudetia ramosa (*Stapf*) *C. E. Hubbard*, comb. nov. *Trichopteryx ramosa* Stapf in Kew Bull. 1897, 298.

Distr. South West Africa.

Loudetia anomala *C. E. Hubbard et Schweickerdt*, sp. nov.; affinis *L. ramosae* (Stapf) C. E. Hubbard, sed culmis altioribus simplicibus, foliorum laminis latioribus, panicula majore laxa, anthoecii superi lemmate laxe piloso differt.

Gramen perenne (?) ; basis ignota. *Culmi* graciliusculi, 60 cm. (vel ultra) longi, rigidi, simplices, 6-nodes, glabri, laeves. *Foliorum vaginae* internodiis longiores, marginibus superne pilosae et ore laxe barbatae, ceterum glabrae, laeves ; ligulae ad seriem ciliorum

densorum redactae ; laminae lineares, in acumen setaceum attenuatae, usque ad 20 cm. (vel ultra) longae et 7 mm. latae, planae, glabrae vel supra sparse pilosae, marginibus scaberulis exceptis laeves. *Panicula* laxa, 20–25 cm. longa, usque ad 9 cm. lata ; rhachis glabra, laevis vel leviter scaberula ; rami filiformes, erecti vel adscendentes, plerumque 2–4-nati, laxe divisi, marginibus scaberuli, usque ad 12·5 cm. longi ; pedicelli inaequales, laterales usque ad 3 mm. longi, terminales usque ad 8 mm. longi. *Spiculae* lanceolatae vel oblongae, 6–9 mm. longae, pallidae et plus minusve purpureo-suffusae. *Glumae* tenuiter chartaceae, glabrae, 3-nerves vel superior 5-nervis ; inferior ovata, tenuiter acuta, 4·5–6 mm. longa, nervis minute scaberulis ; superior lanceolata vel anguste ovata, acuta, spiculae aequilonga. *Anthoecium inferum* ♂ : lemma oblongo-ovatum, acutum, usque ad 7 mm. longum, 5–7-nerve, glabrum ; palea anguste oblonga, 5–6 mm. longa, membranacea, carinis angustissime alatis et sparse ciliolatis vel glabris. *Anthoecium superum* lanceolatum, ♀: callus rotundato-truncatus, circiter 0.6 mm. longus, pilis usque ad 3 mm. longis barbatus ; lemma tenuiter coriaceum, 6 mm. longum, tenuiter 9–11-nerve, laxe pilosum, 2-lobum, lobis acutis 1-4-nervibus usque ad 3 mm. longis ; arista circiter 10 mm. longa, columna 3 mm. longa ; palea lineari-lanceolata, usque ad 5·5 mm. longa, membranacea, carinis superne incrassatis. *Antherae* 3, 3–4 mm. longae.

South West Africa : Damaraland ; Auros, near Grootfontein, on dolomitic soil, *Schoenfelder* 892 (Type in Nat. Herb. Pretoria, no. 19710).

Cymbopogon Dieterlenii *Stapf* ex Phillips in Ann. S. Afr. Mus. **16**, 336 (1917), pro syn., nomen tantum. Descriptio hic addita auctore H. G. Schweickerdt. Affinis *C. marginato* (Steud.) Stapf sed foliorum laminis multo angustioribus, ligulis multo longioribus, rhacheos internodiis et pedicellis pilis brevioribus ciliatis distinguitur.

Gramen perenne, compacte caespitosum, innovationibus intravaginalibus numerosis, usque ad 50–100 cm. altum. *Culmi* erecti, subvalidi, infra inflorescentiam simplices, 2–4-nodes, teretes, glabri. *Foliorum* basalium vaginae usque ad 12 cm. longae, firmae, striatae, basin versus latae et inter strias sparse et appresse pubescentes, sursum attenuatae et glabrae, persistentes, leviter tortae, eae culmorum virescentes, striatae, glabrae, nonnunquam tortae, fere laxae ; ligulae submembranaceae vel hyalinae, lanceolatae, usque ad 12 mm. longae ; laminae conduplicatae, angustissime lineares, basin versus semiteretes, supra concavae, sursum longe filiforme attenuatae, ad 40 cm. longae, explanatae 1·5–2·5 mm. latae, glaucescentes, nervis primariis utrinque 3 prominentibus, facie et dorso glabrae, margine minutissime scabrae. *Panicula* spathata, compacta, continua vel interrupta, 7–15 (raro 20) cm. longa, circiter 2–3·5 cm. lata ; axis primarius 3–4-nodis, internodio inferiore 8–12 cm. longo, ceteris sursum multo brevioribus ; ramus primarius infimus usque ad 5·5 cm. longus, vix exsertus, axis primarii

internodio plerumque brevior ; rami sequentes e basi in radios 2–3 divisi ; radii semiteretes, filiformes, 4–12 mm. longi, simplices, glabri vel pubescentes, vaginis spathoideis subtendentibus plus minusve inclusi ; spatheolae anguste lanceolatae, 2–3 cm. longae, rubescentes, submembranaceae, elaminatae, glabrae, striatae, marginibus membranaceis ; pedunculi 4–10 mm. longi, glabri vel pubescentes, nodo barbato. *Racemi* 2-nati, demum divaricati, 1·5–2 cm. longi, villosuli, alter sessilis, alter basi internodio gracili fere 2 mm. longo suffultus ; rhacheos internodia inferiora in spiculas fertiles apice in cupulam obliquam dentatam ampliata, cetera sursum leviter dilatata, apice truncata, apice et secus angulos albo-villosa, villis lateralibus 1·75 mm. longis. *Spiculae fertiles* oblanceolatae, 5·5 mm. longae ; callus brevissimus, barbatus ; glumae subaequilongae ; inferior glabra, bicarinata, carinis supra medium late alatis, inter carinas 3–5-nervis ; alae irregulariter dentatae et minutissime ciliolatae ; superior navicularis, 1-nervis, lanceolata, margine membranacea et ciliata, carina alata et minutissime ciliolata ; anthoecium inferius ad lemma hyalinum 2–3-nerve oblongum ciliatum 4 mm. longum redactum ; anthoecii superi lemma 4·5 mm. longum, usque ad medium bifidum, membranaceum, lobis anguste lanceolatis ciliatisque ; arista 10·5 mm. longa, columna 6·5 mm. longa glabra ; antherae 2–3 mm. longae ; lodiculae 2, plus minusve 0·5 mm. longae. *Spiculae pedicellatae* ♂, 5 mm. longae, lanceolatae, glabrae ; pedicelli 2 mm. longi, compressi, marginibus pilis 1·75 mm. longis ciliatis ; gluma inferior bicarinata, carinis et marginibus ciliatis, inter carinas 7–9-nervis, superior paulo brevior atque 1–3-nervis, marginibus ciliatis ; lemma hyalinum, 3·5 mm. longum, oblanceolatum, 5-nerve, marginibus sursum ciliatum ; antherae 3 mm. longae ; lodiculae 2, plus minusve 0.5 mm. longae. *Andropogon Dieterlenii* Stapf ex Phillips in Ann. S. Afr. Mus. **16**, 336 (1917), nomen.

South Africa : Basutoland, Leribe, mountain slopes and veld, autumn, *Dieterlen* 390 (type).

A description of the above species apparently was never published. In order to validate this name a description has now been drawn up on basis of the material in Herb. Kew, which had been examined and written up by Stapf.

Oryzidium, a New Genus from South West Africa.

C. E. Hubbard & H. G. Schweickerdt.

Oryzidium *C. E. Hubbard et Schweickerdt*, gen. nov. e tribu *Paniceae* ; distinguitur spiculis adaxialibus in ramis paniculae ortis cum pedicellis continuis, pedicellis demum basi disarticulantibus, gluma inferiore plerumque parva, gluma superiore spiculae aequilonga longiaristata, rhachilla inter anthoecia applanata leviter elongata supra anthoecium superum nonnunquam minute producta.

Spiculae omnes similes, lanceolatae, acute acuminatae, aristatae, dorso compressae, solitariae, pedicellatae, adaxiales, cum pedicellis

Fig 2. *Oryzidium Barnardii* C. E. Hubbard et Schweickerdt. A, inflorescence and uppermost leaf; B, portion of branch of inflorescence; C, spikelet and pedicel, ×3; D, upper glume (awn removed), ×6; E, lower glume, ×6; F, lower floret, from back, ×6; G, lower and upper florets, ×6; H, lemma of lower floret, ×6; I, palea of lower floret, ×6; J, male flower, ×5; K, upper floret and internode of rhachilla, ×6; L, lemma of upper floret, ×6; M, palea of upper floret, ×6; N, lodicules, enlarged; O, lodicules, filaments and immature caryopsis, enlarged; P, Q, caryopsis, ×6.

continuae, pedicellis demum basi disarticulantibus, in ramis angulatis paniculae ortae ; rhachilla inter anthoecia applanata, leviter elongata, continua, supra anthoecium superum nonnunquam minute producta. *Anthoecia* duo ; inferum ♂ ; superum ♀, infero brevius. *Glumae* valde dissimiles ; inferior plerumque parva, membranacea, marginibus hyalinis, enervis vel 3-nervis ; superior spiculae aequilonga, explanata lanceolato- vel elliptico-oblonga, acuminata, arista longa stricta rigida scaberula terminata, prominenter 7-nervis, inter nervos firma. *Anthoecium inferum* : lemma gluma superiore brevius, lanceolatum, acutum, explanatum late lanceolatum, firmum, tenuiter 5-nerve ; palea lemmate brevior, oblonga, minute bifida, bicarinata, hyalina, inter carinas plana. *Anthoecium superum* stipitatum, oblongum, acuminatum : lemma explanatum oblongo-ellipticum, mucronulatum, tenuiter coriaceum, marginibus firmis angustis incurvis, tenuiter 7-nerve ; palea ovato-lanceolata, acuta, lemmati aequilonga, dorso plana, tenuiter coriacea, 2-nervis. *Lodiculae* 2, carnosae, cuneatae. *Stamina* 3 ; antherae oblongo-lineares. *Ovarium* stipitatum, anguste ovoideum, glabrum ; styli distincti. *Caryopsis* oblonga, dorso valde compressa, inter lemma et paleam arcte inclusa ; scutellum circiter tertiam partem caryopsidis aequans ; hilum oblongum, parvum.

Gramen aquaticum (?) ; foliorum laminae lineares, planae ; ligulae brevissimae, ciliatae ; paniculae rami demum de rhachi disarticulantes.

Species 1, Africae meridionalis incola.

Oryzidium Barnardii *C. E. Hubbard et Schweickerdt*, sp. nov. *Gramen* perenne (?), 90–120 cm. altum ; basis ignota. *Culmi* paniculam versus tenuiter striati, teretes, graciliusculi, glabri, laeves. *Folia* summa glabra ; vaginae striatae, laeves ; ligulae ad seriem ciliorum circiter 1–2 mm. longorum redactae ; laminae usque ad 30 cm. (vel ultra) longae et 0·8 cm. latae, flaccidae, marginibus scabrido-serratis exceptis laeves, tenuiter nervosae. *Panicula* angusta oblonga, circiter 25 cm. longa et 3–4 cm. lata, contracta, erecta ; rhachis inferne teres et laevis, apicem versus angulata et scabrida ; rami gracillimi, suberecti, angulis valde scabri, fasciculati vel solitarii, divisi, ramulis erectis, inferiores 10–15 cm. longi ; pedicelli angulati, scabridi, 0·5–1·5 cm. longi. *Spiculae* erectae, circiter 9–10 mm. longae, pallide virides. *Gluma inferior* late oblata vel late ovata, obtusa, 1–2 mm. longa, raro lanceolata, acuta, mucronata et usque ad 5 mm. longa, laevis vel minute asperula ; gluma superior nervis scabra, arista 10–18 mm. longa. *Anthoecium inferum* : lemma 8–9 mm. longum, laeve, glabrum ; palea 5–5·5 mm. longa, carinis ciliolata ; antherae circiter 3 mm. longae. *Anthoecium superum* stipite circiter 1 mm. longa praeditum: lemma 5 mm. longum, glabrum, laeve ; palea 5 mm. longa ; caryopsis 3–3·5 mm. longa, pallida.

South West Africa : Ovamboland ; Tamansu, in vleis, March–April 1923, *Barnard*.

Oryzidium is not closely related to any genus at present known from the African continent. It bears a slight superficial resemblance to some long-awned species of *Echinochloa* Beauv., but may be readily distinguished by the different kind of inflorescence, elongated pedicels which are continuous with the adaxial spikelets, long-awned upper glume, awnless lower lemma, and by the elongated rhachilla-internode between the lower and upper florets. Amongst extra-african plants, our new genus probably shows closest affinity with *Chaetium* Nees, a tropical American genus of which the area of distribution extends from Mexico to Brazil. *Chaetium* differs, however, by the presence of a distinct callus-like base to the spikelets, the persistent pedicels, long-awned lower glume, sterile lower floret reduced to the short-awned lemma and by the absence of a definite internode between the florets. The material of *Oryzidium* at present available is rather meagre, but there is sufficient to obtain a clear idea of the structure of the spikelets, although it is insufficient to give a complete specific description.

A New Genus from North East Africa.

C. E. Hubbard.

Phaenanthoecium *C. E. Hubbard*, gen. nov.; a *Danthonia* D.C., culmis decumbentibus vel adscendibus multinodibus plerumque multiramosis, foliorum laminis brevibus horizontaliter patentibus, glumis plerumque oblongis emarginatis vel bilobis, gluma inferiore 1–3-nervi, anthoeciis e glumis longe exsertis distinguendum.

Spiculae anguste oblongae, a latere leviter compressae, aristatae, in racemis angustis breviter pedicellatae ; rhachilla supra glumas et inter anthoecia disarticulans, internodiis gracilibus glabris. *Anthoecia* 5–9, ♀ vel summa redacta, e glumis exserta. *Glumae* persistentes, anguste oblongae vel elliptico-oblongae, obtuse bilobae, emarginatae vel obtusae, leviter inaequales, membranaceae ; inferior 1–3-nervis, dorso rotundata vel carinata ; superior 3–4-nervis, dorso rotundata. *Lemmata* e glumis exserta, angusta, acuminata, dorso rotundata, membranacea, marginibus angustis hyalinis, 9-nerve, breviter biloba, lobis in setam tenuem longam attenuatis, e sinu loborum aristata ; arista geniculata, columna torta ; callus brevissimus, truncato-obtusus, barbatus. *Paleae* lineari-oblongae, obtusae vel truncatae, bicarinatae, membranaceae. *Lodiculae* duae, cuneatae, minutae, ciliolatae. *Stamina* tria. *Ovarium* glabrum ; styli distincti, terminales ; stigmata breviter plumosa, ex anthoeciis lateraliter exserta. *Caryopsis* lineari-oblonga, concavo-convexa, inter lemma paleamque laxe inclusa ; embryo quadrantem singulum caryopsidis aequans.

Gramina perennia ; culmi decumbentes vel adscendentes, nonnunquam valde elongati, multinodes, plerumque multiramosi, graciles ; laminae anguste lineares, planae vel convolutae ; ligulae ad seriem ciliorum redactae ; racemi paucispiculati.

Species 1, montium Africae boreali-orientalis incola.

Phaenanthoecium Köstlinii (*Hochst.*) *C. E. Hubbard*, comb. nov. *Danthonia Köstlinii* Hochst. ex A. Rich. Tent. Fl. Abyss. **2**, 421 (1851) ; Steud. Syn. Pl. Plum. **1**, 245 (1854). *Streblochaete Köstlinii* Hochst. in Schimper, Iter. Abyss., sect. secunda, sub no. 683 (1843), nomen. *S. Schimperi* Hochst. ex Steud. Syn. Pl. Glum. **1**, 245 (1854), in syn.

Sudan : Darfur ; Jebel Marra, above waterfall, 2460 m., hanging down rock-faces by cascade, just out of reach of spray, *Lynes* 44.

Eritrea : Ocule Cusai ; Soyra Mtns., Mt. Cocaja, 2700–2880 m., *Pappi* 1337 : Scimezana ; Guna-Guna, 2190 m., *Pappi* 674 (ex Chiov. in Ann. Istit. Bot. Roma, **8**, 344 : 1908).

Abyssinia : Tigre ; Mt. Scholoda, 1837, *Schimper* 412 ; Mettaro, 2400 m., 1862, *Schimper* 323.

According to Lynes this grass hangs down in long trails 6 to 7 ft. in length.

The genus *Streblochaete* Hochst. was proposed by Hochstetter for *S. nutans* Hochst. and *S. Köstlinii* Hochst., on printed labels issued with Schimper iter Abyssinicum, Sect. secunda, no. 683 (c. 1843). No generic or specific descriptions were given. Later the two species were referred to other genera by A Richard (Tent. Fl. Abyss. **2** : 1851), *S. nutans* to *Trisetum* (p. 417), and *S. Köstlinii* to *Danthonia* (p. 421). Steudel (Syn. Pl. Glum. **1**, 245 : 1854) included both species under *Danthonia* and they have been retained in this genus by most authors. In 1906 Pilger (Engl. Bot. Jahrb. **37**, Beibl. no. 85, 61) quite rightly recognised *Streblochaete* Hochst. as a genus distinct from *Danthonia* and supplied a short generic description. He limited the genus to one species, *Streblochaete nutans* Hochst. (=*S. longiaristum* (A. Rich.) Pilger) and retained *S. Köstlinii* in *Danthonia*. *Streblochaete* has a fairly wide distribution in tropical Africa, occurring in the west on the Cameroons Mountain and in the east on mountains from Abyssinia southwards to Nyasaland. It is also known from Réunion, Java and the Philippine Islands. The Javanese plant was described as a new genus *Koordersiochloa* by Merrill (Philipp. Journ. Sci., Bot. **12**, 67, t.1 : 1917) and the Réunion plant as a new genus *Pseudostreptogyne* by A. Camus (Bull. Soc. Bot. France, **57**, 476, figs. 1–13 : 1930). *Streblochaete* may be distinguished from *Phaenanthoecium* by the following characters :—the paniculate inflorescence ; membranous ligule ; herbaceous glumes and lemmas, the latter entire or shortly 2-lobed with the lobes obtuse or acute ; the slender coiled and entangled awns, each of which is inserted on the back of the lemma below the sinus of the two lobes or entire tip.

The Species of Helictotrichon in Tropical Africa.

C. E. Hubbard.

Helictotrichon angustum *C. E. Hubbard*, sp. nov. ; affine *H. umbroso* (Hochst.) C. E. Hubbard, spiculis longioribus 3–5-floris, rhachillae internodiis usque ad 2 mm. longis, lemmatibus breviori-bus 5-nervibus, arista triente superiore lemmatis orta differt.

Gramen perenne caespitosum, circiter 60 cm. altum. *Culmi* erecti, graciles, simplices, 2-nodes, glabri, laeves. *Foliorum vaginae* angustae, internodiis breviores, inferiores minute pubescentes vel glabrae, laeves ; ligulae oblongae, laceratae, usque ad 2 mm. longae ; laminae anguste lineares, in acumen tenue attenuatae, usque ad 15 cm. longae, 1–2·5 mm. latae, planae, erectae, glabrae, subtus laeves, supra tenuiter scaberulae. *Panicula* linearis vel linearilanceolata, contracta, interrupta, leviter nutans, 14-20 cm. longa, 1·2–2·5 cm. lata ; rhachis gracillima, inferne laevis ; rami 2-3-nati, erecti, paucispiculati, simplices vel sparse divisi, filiformes, scaberuli, inferiores usque ad 5 cm. longi ; pedicelli laterales 2–3 mm. longi, terminales elongati. *Spiculae* anguste oblongae, 10–14 mm. longae, pallide virides, appressae. *Glumae* tenuiter acutae, mucronatae, carina superne scaberulae, marginibus et apice hyalinis ; inferior lanceolata, 5·5–6 mm. longa, 1-nervis ; superior anguste oblongo-lanceolata, 7·5–9 mm. longa, 3-nervis. *Anthoecia* 3–5 : rhachillae internodia usque ad 2 mm. longa, pilis usque ad 2 mm. longis pilosa ; callus obtusus, brevissimus, breviter barbatus. *Lemmata* exserta, a latere visa anguste lanceolata et setaceo-acuminata, 6-7·5 mm. longa (inferiora), coriacea, marginibus angustis et apice hyalinis, 5-nervia, superne scabrida, apice biloba, lobis setam tenuem usque ad 3 mm. longam gerentibus ; arista triente superiore lemmatis orta, geniculata, 10-16 mm. longa, columna 3-5 mm. longa. *Paleae* oblongo-lineares, 6–6·5 mm. longae, carinis superne ciliolatis. *Antherae* 1·5-2 mm. longae. *Ovarium* apice hispidulum.

KENYA COLONY : Ngong Hills, in red loam, 2100-2400 m., *Edwards* 2960.

Helictotrichon cartilagineum *C. E. Hubbard*, sp. nov. ; ab *H. elongato* (Hochst.) C. E. Hubbard, glumis firme membranaceis marginibus scariosis longioribus, lemmatibus cartilagineis longioribus fere laevibus vel minute granulosis distinguendem.

Gramen perenne caespitosum, usque ad 1·3 m. altum. *Culmi* erecti vel basi geniculati, graciles vel validiusculi, simplices, 2–4-nodes, glabri, laeves. *Foliorum vaginae* striatae, glabrae, raro inferiores sparse pilosi, laeves vel laminam versus asperulae ; ligulae truncatae, circiter 2 mm. longae ; laminae lineares, acutae, usque ad 30 cm. longae, 2–4 mm. latae, planae, glabrae, raro laxe pilosae, supra nervis scaberulae, vel laeves. *Panicula* angusta, 10–38 cm. longa, 1·2–3·8 cm. lata, contracta, moderate densa vel plus minusve interrupta ; rhachis apicem versus scabrida ; rami bini, filiformes, laxe divisi, scabridi, inferiores usque ad 15 cm. longi ; pedicelli laterales 1–3 mm. longi. *Spiculae* oblongae, 10–14 mm. longae, pallide virides vel purpureae. *Glumae* firme membranaceae, marginibus scariosis, carina scaberulae ; inferior oblongo-lanceolata vel oblonga, acuta, 6·5–10 mm. longa, 2–3-nervis ; superior elliptico-oblonga vel oblonga, tenuiter acuta, 9–13 mm. longa, 3–5-nervis. *Anthoecia* 3 ; rhachillae internodia 2–3 mm. longa, pilis 2–3 mm. longis barbata ; callus brevissimus, obtusus, breviter barbatus.

Lemmata vel glumam superiorem non superantia vel ex hac breviter exserta, a latere visa lanceolato-oblonga acuta, 8·5–12 mm. longa (inferiora), rigidissimi, apice scarioso excepto cartilaginea, glabra, minute granulosa vel fere laevia, prominenter 7-nervia, breviter biloba, lobis acutis angustis et in setam brevem abeuntibus ; arista prope medium lemma orta, geniculata, usque ad 2 cm. longa, columna 4–6 mm. longa. *Paleae* lineari-oblongae, 6–7·5 mm. longae, carinis superne rigide ciliolatis. *Antherae* 2–3·5 mm. longae. *Ovarium* hispidulum.

Kenya Colony : Timboroa, in grassland, *Hitchcock* 25055 ; near Timboroa, in grassland, *Hitchcock* 25064 ; Kipkapus, in grassland, *Hitchcock* 25046 ; neighbourhood of Nyeri, Leikipia Plateau and Aberdare Range, *Routledge* ; Mt. Kenya, 3000 m., *Lyne Watt* 1111 ; Kinangop, 2100 m., *Turner* 1578 (type) ; Ngong Hills, 2100–2400 m., *Edwards* 2961 ; Escarpment, *Linton* 185.

Helictotrichon Maitlandii *C. E. Hubbard*, sp. nov. ; affine *H. rigidulo* (Pilger) C. E. Hubbard, a quo foliorum laminis latioribus, panicula lineari angustiore, spiculis paullo longioribus, gluma superiore breviore, rhachillae internodiis longioribus differt.

Gramen perenne, usque ad 1·2 m. altum. *Culmi* erecti vel leviter geniculati, moderate validi, simplices, 3–5-nodes, glabri, laeves. *Foliorum vaginae* internodiis longiores, striatae, inferiores inferne pubescentes, ceterae glabrae, laeves ; ligulae truncatae, usque ad 2·5 mm. longae ; laminae lineares, acutae, usque ad 30 cm. longae, 4·5–6 mm. latae, planae, firmae, supra sparse pubescentes vel glabrae, nervis scaberulae vel fere laeves. *Panicula* linearis, contracta, usque ad 35 cm. longa, circiter 1·3 cm. lata ; rhachis superne scaberula ; rami erecti, bini, inaequales, gracillimi, scaberuli, inferiores usque ad 10 cm. longi ; pedicelli laterales 2–3 mm. longi. *Spiculae* oblongae, 14–16 mm. longae, pallide virides. *Glumae* tenuiter acutae, herbaceae, marginibus et apice scariosis, nervis minute scaberulis ; inferior oblongo-lanceolata, 7·5–9 mm. longa, 3-nervis ; superior oblongo-lanceolata vel anguste elliptico-oblonga, 8·5–11 mm. longa, 4–5-nervis. *Anthoecia* 2–3 ; rhachillae internodia 3–4 mm. longa, pilis usque ad 2 mm. longis laxe pilosa ; callus brevissimus, obtusus. *Lemmata* exserta, a latere visa anguste lanceolata, setaceo-acuta, circiter 10 mm. longa (inferiora), coriacea, 7–9-nervia, superne minute granulosa, biloba, lobis tenuiter acutis et in setam brevem abeuntibus ; arista inter medium et partem trientem superiorem lemmatis orta, usque ad 2 cm. longa, columna 4–5 mm. longa. *Paleae* oblongo-lineares, usque ad 9 mm. longae, carinis superne rigide ciliolatis. *Antherae* 3 mm. longae. *Ovarium* supra medium minute hispidulum.

Southern Nigeria : Bamenda, Lakom, on grass-covered plateau, 2100 m., *Maitland* 9A.

Helictotrichon phaneroneuron *C. E. Hubbard*, sp. nov. ; ab *H. elongato* (Hochst.) C. E. Hubbard, foliorum vaginis inferioribus

dense pubescentibus, panicula laxa latiore, pedicellis lateralibus longioribus, spiculis paullo longioribus, glumis angustioribus distinguendum.

Gramen perenne, laxe caespitosum, usque ad 1·2 m. altum. *Culmi* erecti vel basi leviter geniculati, graciles, simplices, 2-nodes, glabri, laeves. *Foliorum vaginae* striatae, inferiores dense pubescentes, internodiis longiores, ceterae sparse puberulae vel glabrae, laeves, internodiis breviores; ligulae truncatae, circiter 2 mm. longae; laminae lineares, acutae, usque ad 15 cm. longae, 2–3 mm. latae, planae, puberulae vel dense pubescentes. *Panicula* oblonga, laxa, 12–20 cm. longa, usque ad 5·5 cm. lata; rhachis superne scaberula et flexuosa; rami 2–4-nati, filiformes, flexuosi, 4–1-spiculati, scabridi, apicem versus minute hispiduli, inferiores usque ad 5·5 cm. longi; pedicelli laterales 4–14 mm. longi. *Spiculae* oblongae, 11–14 mm. longae, pallide virides. *Glumae* membranaceae, laeves, vel carina scaberulae, tenui- vel setaceo-acutae; inferior lineari-lanceolata vel anguste lanceolata, 6–9 mm. longa, 1-nervis; superior anguste oblanceolata, 8–10 mm. longa, 3-nervis. *Anthoecia* 3; rhachillae internodia 2·5–3 mm. longa, pilis usque ad 3 mm. longis dense barbata; callus brevissimus, obtusus. *Lemmata* breviter exserta, a latere visa oblongo-lanceolata, acuta, 8–10 mm. longa (inferiora), breviter biloba, lobis acutis setam brevissimam gerentibus, apice scariosa, ceterum firma, 7–9-nervia, siccitate striata, scaberula; arista supra medium lemma orta, geniculata, usque ad 18 mm. longa, columna 4–5 mm. longa. *Paleae* lineari-oblanceolatae, 9 mm. longae, carinis supra medium rigide ciliolatae. *Antherae* 5 mm. longae. *Ovarium* apice hispidulum.

Tanganyika Territory: Iringa District; Msima Stock Farm, common in vleis, *Emson* 348 (type); East Ubena; Ukinga-Upangwa, *Hill* H3–30–27.

Helictotrichon Friesiorum (Pilger) *C. E. Hubbard*, stat. nov. *Avenastrum elongatum* var. *Friesiorum* Pilger in Notizbl. Bot. Gart. Berlin, 9, 517 (1926).—Affine *H. umbroso* (Hochst.) C. E. Hubbard, sed spiculis et lemmatibus longioribus, rhachillae internodiis paullo longioribus et pilis longioribus barbatis differt.

Gramen perenne, circiter 75 cm. altum. *Culmi* e basi geniculata erecti, graciles, simplices, 2-nodes, glabri laevesque; internodia superiora exserta. *Foliorum vaginae* striatae, laeves, inferiores pubescentes, ceterae glabrae; ligulae truncatae, usque ad 2 mm. longae; laminae anguste lineares, apice subacutae, usque ad 15 cm. longae, convolutae vel planae, usque ad 2·5 mm. latae, rigidiusculae, laeves, supra sparse pubescentes, subtus glabrae. *Panicula* angusta, erecta, contracta, 10–20 cm. longa, 1·2–1·8 cm. lata; rhachis superne scaberula; rami plerumque bini, erecti vel leviter patentes, filiformes, scaberuli, 1–3-spiculati, inferiores usque ad 6·5 cm. longi; pedicelli laterales circiter 1 mm. longi. *Spiculae* anguste oblongae, 13–16 mm. longae, pallide virides vel purpureo-tinctae. *Glumae* acutae, hyalinae, carina apicem versus scaberulae; inferior

anguste lanceolata, 5–7 mm. longa, 1–sub 3-nervis; superior oblongo-lanceolata, 8–9 mm. longa, 3-nervis. *Anthoecia* 2–3; rhachillae internodia 3–4 mm. longa, apicem versus pilis usque ad 3 mm. longis laxe barbata; callus obtusus, circiter 1 mm. longus, breviter barbatus. *Lemmata* conspicue exserta, a latere visa oblongo-lanceolata, tenuiter acuta, 10–12 mm. longa (inferiora), coriacea, minute granulosa, glabra, 7-nervia, breviter biloba, lobis setaceo-acutis; arista infra medium lemma orta, geniculata, 16–20 mm. longa, columna 6–7 mm. longa. *Paleae* oblongo-lineares, 7–8 mm. longae, carinis superne rigide ciliolatis. *Antherae* 2 mm. longae. *Ovarium* apice hispidulum.

Kenya Colony: Mt. Kenya, Forest Station, 2300 m., *Fries*, 697 (type), 818.

Helictotrichon milanjianum (*Rendle*) *C. E. Hubbard*, comb. nov. *Bromus milanjianus* Rendle in Trans. Linn. Soc., Ser. 2, **4**. 59 (1894).

Distr. Kenya Colony, Uganda, Tanganyika Territory, Belgian Congo, Nyasaland; on mountains, 2100-3300 m.

Helictotrichon umbrosum (*Hochst.*) *C. E. Hubbard*, comb. nov. *Trisetum umbrosum* Hochst. ex Steud. Syn. Pl. Glum **1**, 227 (1854). *T. biflorum* Hochst. in Flora, **38**, 275 (1855). *Avenastrum umbrosum* (Hochst) Pilger in Notizbl. Bot. Gart. Berlin, **9**, 521 (1926), in obs.

Distr. Abyssinia: near Debra Eski, 2790 m., 1850, *Schimper* 179! without precise locality, 1852, *Schimper* 960!

Helictotrichon umbrosum var. **micrantherum** *C. E. Hubbard*, var. nov.; a typo differt, culmis basin versus 2-nodibus, foliorum vaginis glabris, laminis convolutis glabris, panicula 20–25 cm. longa, spiculis usque ad 13 mm. longis, gluma inferiore usque ad 6·5 mm. longa 1-nervi, gluma superiore usque ad 9 mm. longa, rhachillae internodiis 3·5 mm. longis, lemmatibus inferioribus usque ad 10 mm. longis laevibus, aristae columna 5–6 mm. longa, antheris 0·6–1 mm. longis.

Tanganyika Territory: Mt. Kilimanjaro, Peters Hut, 3750 m., *Hitchcock* 24639.

This variety has the appearance of possessing cleistogamous florets, as the very small burst anthers were found entangled amongst the hairs of the loosely plumose stigmas.

Helictotrichon Mannii (*Pilger*) *C. E. Hubbard*, comb. nov. *Avenastrum Mannii* Pilger in Notizbl. Bot. Gart. Berlin, **9**, 520 (1926).

Distr. Cameroons Mtn., 1800-3000 m.; Fernando Po, 2100–3000 m.

Helictotrichon Newtonii (*Stapf*) *C. E. Hubbard*, comb. nov. *Avena Newtonii* Stapf in Kew Bull. 1897, 291.

Distr. Angola.

Helictotrichon rigidulum (*Pilger*) *C. E. Hubbard*, comb. nov. *Avenastrum rigidulum* Pilger in Notizbl. Bot. Gart. Berlin, **9**, 519 (1926).

Distr. Cameroons Mtn., in grassland, 2010-3000 m.

Helictotrichon elongatum (*Hochst.*) *C. E. Hubbard*, comb. nov. *Danthonia elongata* Hochst. ex A. Rich. Tent. Fl. Abyss. **2**, 419 (1851). *Trisetum Neesii* Hochst. ex Steud. Syn. Pl. Glum. **1**, 227 (1854). *Avena festucaeformis* Hochst. in Flora, **38**, 275 (1855). *A. muriculata* Stapf in Kew Bull. 1897, 291. *Avenastrum elongatum* (Hochst.) Pilger in Notizbl. Bot. Gart. Berlin, **9**, 518 (1926). *A quinqueneruе* Stent et J. M. Rattray in Proc. Rhod. Sci. Assoc. **32**, 42 (1933).

Distr. Eritrea, Abyssinia, Kenya Colony, Uganda, Tanganyika Territory, Nyasaland and Southern Rhodesia.

Helictotrichon lachnanthum (*Hochst.*) *C. E. Hubbard*, comb. nov. *Trisetum lachnanthum* Hochst. ex A. Rich. Tent. Fl. Abyss. **2**, 416 (1851). *Avena lachnantha* (Hochst.) Hook. f. in Journ. Linn. Soc., Bot. **7**, 229 (1864), excl. specim. *A. Rothii* Stapf in Kew Bull. 1897, 292. *Avenastrum lachnanthum* Pilger in Notizbl. Bot. Gart. Berlin, **9**, 521 (1926).

Distr. Abyssinia, Kenya Colony, Uganda and Tanganyika Territory.

Avenastrum flabellatum *A. Peter* in Fedde, Repert., Beih. **40**, 1. Anhang, 98 (1930).

Tanganyika Territory: Uvinsa, east of Lugufu, *Peter* 36642 (type), 46153.

An examination of the type specimen, which was kindly lent to Dr. Schweickerdt, indicates that it is not a species of *Helictotrichon* (*Avenastrum*) but rather a species of *Diplachne* or a closely allied genus. It is related to *Diplachne biflora* Hack. and represents the same species as the following specimens in the Kew Herbarium:—Tanganyika Territory: N. Mpwapwa, 1500 m., *Staples* 469; Mpwapwa, Kibariana Mtn., 1650 m., *Burtt* 3952; Mbeya District, Unyamwanya, 1500 m., *Davies* 182; Mbosi, 1200 m., *Davies* 610; Kyimbila, *Stolz* 2570. Northern Rhodesia: on Abercorn—Mbosi road, 1560 m., *St. Clair-Thompson* 1114. The biseriate arrangement of the spikelets, 1-nerved upper glume, 3-nerved bearded lemmas, smaller paleas and non-geniculate awns are characters which serve to distinguish it from *Helictotrichon*.

XXXIII—MISCELLANEOUS NOTES.

Birthday Honours.—We have much pleasure in recording the conferment of the following Honours: a Knighthood on Prof. A. C. Seward, F.R.S.; C.I.E. on Dr. F. J. F. Shaw, Director of

the Institute of Agricultural Research, and Imperial Economic Botanist, India; C.V.O. on Mr. W. J. Bean, late Curator of the Royal Botanic Gardens, Kew; C.B.E. on Mr. R. W. Thornton, Director of Agriculture, Basutoland; O.B.E. on Mr. E. H. F. Havelock, Secretary, Development Commission and Administration Secretary, Agricultural Research Council, and on Mr. G. F. Clay, Deputy Director of Agriculture, Uganda; M.B.E. on Mr. F. H. Butcher, late Curator, Government Gardens, Ootacamund, Madras, on Mr. H. R. Edmunds, Superintendent of Agriculture, Kalimpong, Bengal, and on Mr. E. W. Swanton, Curator, Haslemere Educational Museum.

The Professorship of Botany at Cambridge.—Sir A. C. Seward, F.R.S., has retired from the Chair of Botany at Cambridge, which he has held since 1906. Mr. F. T. Brooks, F.R.S., Reader in Botany in the University, has been appointed to succeed him.

Shirley Clifford Atchley.—The news of the death at the age of 65 of Mr. S. C. Atchley, C.M.G., O.B.E., has been received with profound regret at Kew. For many years he was Translator with the local rank of a First Secretary at the British Legation, Athens, and was well known to all who had an interest in the flora of Greece. He died suddenly of heart failure when climbing Mt. Kyllene on the evening of Saturday, 20 June, 1936, and was buried the next day at the village of Trikala.

Atchley was a most versatile man, of a lovable honest nature, with a whimsical personality, and almost boundless energy. His knowledge of the Greek language was perfect, and his great services to both Great Britain and Greece are indicated in the obituary notice of him published in "The Times" for 22 June, 1936.

In 1929, the Director of Kew wrote to Atchley and asked if, in his wanderings through Greece, he would collect and dry plants for the Herbarium. Atchley at once responded, and there resulted as gifts to Kew a magnificent series of specimens which needed some 4000 sheets in mounting, besides duplicates which have been presented to other institutions. The specimens were carefully collected, well dried, and nearly always abundant. Many of the plants were tentatively (and usually correctly) named before dispatch. Except for the last two parcels, one of which was only received at Kew with a letter from him the day before his death, they have all been mounted and laid in, and thus form a permanent memorial to his botanical activities and his love of botany. The range of localities in his collections is remarkable and indicates his wide personal knowledge of Greece and especially of the mountains. Crete, the Peloponnese, the mountains north of the Gulf of Corinth, Epirus, Euboea, Thessaly, and Greek Macedonia were all traversed by him and searched for plants. Some of his discoveries have already been recorded in Kew botanical publications, and others are to be prepared for printed record. Atchley's collections have filled in many

gaps in the Kew collections and have extended the known distribution of a great many species. Several species new to science were discovered by him, and it is hoped that descriptions of these will appear soon.

In addition to his activities on behalf of the Herbarium, Atchley sent many plants, bulbs, and seeds to the Gardens. Many private gardens have also benefited greatly from similar gifts. Mention should also be made of the great assistance he rendered to visitors to Greece, and especially to those with botanical or horticultural interests. Frequently he accompanied them on their expeditions. Always he gave most valuable help and advice.

On his many visits to Kew, Atchley was always a delightful conversationalist, and his information was not only botanical, but included many amusing stories of his life and experiences in Greece. These visits always resulted in kind offers of future help in the building up of a thoroughly representative set of plants of the Balkan Peninsula. He enjoyed strolling through the Rock Garden, the Herbaceous Ground, and the Alpine House, pointing out his favourite species and genera, offering to send additions, and sometimes asking for seeds or bulbs to be sent to Athens.

The writer wishes to place on record his own deep sense of loss by Atchley's death, and to acknowledge the great help he has received in his studies by correspondence and by conversation with an irreplaceable friend.

W. B. Turrill.

Vegetables and Fruits.—This useful reference work* should prove to be of great value to workers in a number of different fields, in fact to all those concerned with the utilisation of the edible plant products commonly regarded as vegetables and fruits. Other volumes of the same work deal with vegetable food products not falling under these two categories and with animal food products.

In the introduction to this volume an account is given of the chemical nature of some of the commoner constituents of fruits and vegetables, such as chlorophyll and other colouring matters, organic acids, pectins, vitamins and other substances. The first half of the book (part 1) is devoted to vegetables, including dry legumes ; about 150 are dealt with, excluding mushrooms and other edible fungi, which are treated separately. All the well-known vegetables of temperate and tropical regions are included, in addition to those that are little known, or well-known only in their native countries, such as the chinese water chestnut (*Eleocharis tuberosa*), the udo (*Aralia cordata*) and bamboo shoots. Under fruits an equally wide range is to be found, from such everyday commodities as dates, apples, and citrus fruits to the Kei apple (*Aberia caffra*) and pitaya (*Hylocereus undulatus*).

*" The Structure and Composition of Foods " By A. L. Winton and K. B. Winton, Vol. II. Vegetables, Legumes, Fruits. New York, John Wiley & Sons Inc., London, Chapman & Hall Ltd., 1935, pp. 904. Price 75s. net.

Subjects appear in the text under their common name followed by the botanical name and the common French, Spanish, Italian, and German equivalents. Each subject receives a few general introductory remarks followed by information under the headings of " macroscopic structure ", " microscopic structure " and " chemical composition ". Under the second of these the various tissues of which the commodity in question is composed are described, and helpful illustrations of the anatomy accompany the text. This part of the work is stated in the preface to " represent the authors' original work, in large part here recorded for the first time ". The information supplied under " chemical composition " is largely in tabular form and varies somewhat in detail in accordance with the degree of importance of the commodity in question. It has been drawn from many sources and the numerous references, appearing as foot-notes, should prove of special value. A detailed general index is included.

F. N. Howes.

Flora of Victoria.*—In the present work, produced under the direction of Professor Ewart, we have a further regional Flora on the lines of F. M. Bailey's " Queensland Flora," and J. M. Black's " Flora of South Australia." Phanerogams and Pteridophytes are included within the scope of the work, the arrangement following the classification of Engler and Prantl. A complete system of keys enables the student to run down any species, while in addition a short description of each species is provided, as well as notes on geographical distribution, etc. The general format is satisfactory, although some of the illustrations are rather indistinct. It is to be regretted that the International Rules of Nomenclature are not always followed.

Botanical Magazine.—Part 2 of volume 159 was published on May 28th. The opening species figured is *Campanula Formanekiana* Degen et Dörfler (t. 9436), a distinct species with a restricted distribution in the mountains of Macedonia. Other species figured are :—*Forsythia ovata* Nakai (t. 9437), an attractive endemic Korean species which, owing to its early flowering and neat habit, has proved a most valuable garden plant ; *Linaria delphinioides* Gay (t. 9438), a member of a group of critical toadflaxes endemic in the Iberian Peninsular ; *Clematoclethra actinidioides* Maxim. (t. 9439), a Chinese climber belonging to a critical genus allied to *Saurauia* ; *Kalanchoe Blossfeldiana* v. Poellnitz (t. 9440), a well-known greenhouse succulent discovered in Madagascar by H. Perrier de la Bâthie and introduced to cultivation by Herr R. Blossfeld of Potsdam ; *Saxifraga signata* Engler et Irmscher (t. 9441), a member of the *Hirculus* section discovered in N.W. Yunnan by Forrest in 1906 ; *Rhododendron chrysodoron* Tagg ex Hutch. (t. 9442),

* By Prof. A. J. Ewart. Melbourne University Press and Macmillan & Co. Ltd., 1930. Pp. 1257, 1 coloured plate, 349 text figs. Price 30s.

a beautiful yellow-flowered species of the *Boothii* series from Yunnan; *Narcissus Watieri* Maire (t. 9443), a white-flowered species discovered by M. Watier in the Great Atlas ; *Adenophora morrisonensis* Hayata (t. 9444), an endemic Formosan member of a genus closely allied to *Campanula* ; *Phalaenopsis Denevei* J. J. Smith (t. 9445), a yellow-flowered species native in Dutch West Borneo, and one of the most striking of recent orchid introductions ; and *Picea rubens* Sargent (t. 9446), the Red Spruce of Eastern North America, better known under the name of *P. rubra*, which is invalid for nomenclatural reasons.

Pollen Grains.*—At the present time the defects of botanical science due to lack of co-operation between taxonomists and those interested in other branches of the subject are beginning to be appreciated, and the appearance of a book which points the way to a line of co-operation is an important event. Dr. Wodehouse's book on pollen not only shows how a study of pollen grain morphology can serve as an aid to taxonomists but it is also of use to palaeo-botanists and those interested in the phylogeny of plants.

The book is divided into two main parts ; in the first the subject is treated generally, whilst part two is concerned with classification. The subject matter of the first hundred pages is historical, and deals not only with pollen grains themselves, but also with old views on pollination, fertilization and related subjects. It is of special interest to those familiar with Kew botanists that the epitaph on the tomb of Francis Bauer is reproduced in full. It is a striking fact that very little work on pollen grains was published in England (apart from the very early work of Hooke and Grew) until 1877, when M. P. Edgeworth published his book " Pollen ". It is disconcerting to learn that the descriptions in this book " are for the most part erroneous, and the figures purely imaginary, having almost no basis in fact " ; also that such fragmentary work as was done on pollen in this country totally disregarded that done on the Continent. Dr. Wodehouse's book continues with sections dealing with the methods of collecting pollen, pollen statistics and atmospheric pollen, whilst a short chapter on the preparation of pollen for microscopical examination will be of special interest to many, as this subject receives little or no treatment in many books on microscopical technique. The study of hay-fever in the U.S.A. has assumed considerable importance recently, and a special chapter on this subject is welcome. It is unfortunate, however, that the plants in this chapter are referred to so frequently only by local names. In a chapter on pollen-grain characters the author shows how the structure of the grains of different species is determined by pre- and post-natal environmental factors, as well as by heredity.

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*" Pollen Grains. Their Structure, Identification and Significance in Science and Medicine." By R. P. Wodehouse. McGraw Hill Book Co. Inc. New York and London, 1935. Pp. xv+574. 36s. net.

In the second part, the structure of the pollen grains of fossil and present-day gymnosperms is described, as well as that of a considerable but by no means comprehensive range of angiosperms, arranged under families. Those who wish to use the book for the identification of pollen may be disappointed at the comparatively small number of different kinds (especially amongst monocotyledons) that are dealt with. Only 242 pages are devoted to descriptions of angiosperm grains. It is, of course, impossible to include every species within the compass of a single volume, but such a subject as the interrelationships of gymnosperms might well have been omitted and a greater number of different kinds of grain described. It is also remarkable that, in a book which deals with pollen from so many aspects, no mention is made of pollen in honey. The author has, however, performed a valuable service in demonstrating the importance of pollen-grain morphology by devoting a whole book to the subject, and by providing a high standard of description. The technical terms are defined in a glossary, and, what is still more important, references are given in the glossary to figures in the text which illustrate precisely what is intended by each definition. The book is well bound and printed, and the illustrations are all original and mostly drawn by the author himself.

C. R. METCALFE.

All about the Soya Bean.*—The soybean enters largely into the diet of the peoples of China and Japan. Its proteins, carbohydrates and oil are all easily digested and its ash is particularly rich in phosphorus. In these countries it replaces most efficiently meat and dairy products in the diet of the people, both old and young, and thus enables them to compete so successfully with western countries in manufacturing industries. The author's long residence in China, combined with his medical knowledge and training, has enabled him to appreciate fully the properties of this remarkable pulse and to justify his plea for the more extended use of the soybean in this country and in Europe.

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* By Col. G. D. Gray, M.D., C.B.E., with an Introductory Chapter by J. L. North. London, John Bale, Sons & Danielsson, Ltd. 1936. Pp. ix + 140; plates 7. Price 7*s.* 6*d.*

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